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IOWA

FOREST RESOURCES

1974

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rth Central Forest Experiment Station
rest Service, U.S. Department of Agriculture

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FOREWORD

This report presents Iowa's forest resources in 1974 as found by the second Forest Survey of the State. It provides information concerning forest area, timber inventory, growth, mortality, removals, timber products output, future timber supply, forest management opportunities, and nontimber resources. It compares some of these findings with those of the 1954 survey.

Resources Evaluation (formerly called Forest Survey) is a continuing endeavor as mandated by the Forest and Rangeland Renewable Resources Planning Act of 1974, which was preceded by the McSweeney-McNary Forest Research Act of 1928. Its objective is to inventory periodically the nation's forest land to determine its extent, condition, and volumes of timber, growth, and depletions. This kind of up-to-date information is essential to frame intelligent forest policies and programs. USDA Forest Service regional experiment stations are responsible for conducting these inventories and for publishing summary reports for individual States. The North Central Forest Experiment Station is responsible for Resources Evaluation work done in Michigan, Wisconsin, Minnesota, North Dakota, eastern South Dakota, Nebraska, Iowa, Illinois, Indiana, Missouri, and Kansas.

Fieldwork for the 1974 Iowa Forest Inventory was begun in May 1973 and completed in June 1974. The report of the first inventory in 1954 provides a basis for comparing the information in this report for those interested in trends that have developed during the past 20 years.

Personnel from the Iowa Conservation Commission canvassed primary wood-using plants in the State, which helped in estimating the quantity of timber products harvested in Iowa. Iowa District Foresters also canvassed a sample of rural households to determine the quantity of fuelwood, posts, and miscellaneous timbers cut on private, nonindustrial land.

The USDA Agricultural Stabilization and Conservation Service furnished aerial photos used in the survey.

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HIGHLIGHTS

Forest Area

Forest land in Iowa totaled 1,561 thousand acres in 1974, down 34 percent from the 2,348 thousand acres in 1954.

Commercial forest land amounted to 1,459 thousand acres in 1974, a 36 percent plunge from the 2,297 thousand acres in 1954. Conversion of commercial forest to pasture or other agricultural uses is the primary reason for the decline.

Oak forest types covered 56 percent of the commercial forest area. The white oak-red oak-hickory type was largest with 515 thousand acres.

Sawtimber stands (54 percent of the commercial forest area) and poletimber stands (24 percent) dominated the State in 1974.

Farmers owned two-thirds of the commercial forest area in 1974.

Timber Volume

Volume of growing stock on commercial forest land totaled 1.1 billion cubic feet in 1974, down 22 percent from the 1.3 billion in 1954.

Volume in sawtimber trees was 3.5 billion board feet, a 30 percent drop from the 5.0 billion in 1954.

Growing-stock volume was highest in the Southeastern and Northeastern Units, each with 44 percent of the State's total.

Hardwoods, primarily oaks, accounted for virtually all of the growing-stock volume.

Average volume per acre of growing stock in 1974 was 723 cubic feet, compared with 587 cubic feet in 1954.

Volume in nongrowing-stock trees, chiefly in rough trees, amounted to an additional 308 million cubic feet in 1974.

Black walnut growing-stock volume fell 38 percent between 1954 and 1974 from 51.5 to 31.8 million cubic feet.

Growing-stock inventory is projected to decline from 1,055 million cubic feet in 1974 to 932 million in 2004, assuming a low level of timber removals, or to 774 million, assuming a high level of timber removals.

Stand Characteristics

Net annual growth on growing-stock trees totaled 41 million cubic feet in 1973 (3.9 percent of inventory).

Mortality of growing-stock trees amounted to 7 million cubic feet in 1973 (0.7 percent of inventory).

Seventy-seven percent of the commercial forest is capable of growing trees 50 feet and taller at age 50, but only 25 percent of the area is capable of growing trees 70 feet and taller at the same age.

Three-fourths of the State's commercial stands were poorly-stocked or nonstocked with growing-stock trees.

Stands were about equally divided by area in 10-year age classes up to age 90.

Timber Use

Sixty-five primary wood-using plants were operating in 1972 in Iowa—60 were sawmills. In 1952 more than 1,000 sawmills operated in the State.

Output of roundwood products in 1972 was 22.9 million cubic feet compared with 36.6 million in 1953. In 1972 fuelwood accounted for the largest portion of roundwood products output—9.8 million cubic feet.

Iowa's 60 active sawmills produced 56 million board feet of lumber in 1972. Since 1941, production has ranged between 43 and 91 million board feet annually.

Pulpwood production amounted to 55 thousand cords in 1972—24 thousand cords from plant byproducts alone.

Growing-stock removals in 1973 were 50.3 million cubic feet.

Removals of growing stock are projected to drop to 38.4 million cubic feet in 2003, assuming a low level of removals, or to 44.3 million cubic feet, assuming a high level of removals.

Management Opportunities

Sixty-nine percent of the commercial area grows stands that require no treatment between 1974 and 1984.

Fifteen percent of the area does not contain a manageable stand because of the paucity of stocking, suggesting stand conversion or regeneration treatments.

Fourteen percent of the area is composed of stands whose age and site index indicate they are ready for harvest or will be within the next decade.

Only 2 percent of the area is in immature and overstocked stands where thinning would be appropriate.

Nontimber Resources

Total attendance at Iowa's 71 State Parks in 1974 was 12.1 million people, 433 thousand of whom were campers.

In 1974, Iowans purchased 329 thousand resident fishing licenses, 176 thousand resident hunting licenses, and 147 thousand combination licenses.

In 1974, 307 thousand hunters bagged 1.7 million pheasants in Iowa, making it the number one game species in the State—both in terms of number of hunters and in number of birds taken.

Of the 238 million gallons of water consumed each day in Iowa during 1970, 150 million gallons were for rural use—primarily for livestock.

IOWA'S FOREST RESOURCES, 1974

John S. Spencer, Jr., *Principal Resource Analyst,*
and **Pamela J. Jakes,** *Associate Resource Analyst*

TIMBER RESOURCE TRENDS

Known worldwide for its prolific yields of corn, Iowa is much less well-known as a grower of trees. Yet in 1974, 1,561 thousand acres of forest land existed in the State, which amounts to 4 percent of its total land area (fig. 1). This was down 34 percent from the 2,348 thousand acres in 1954.[1]

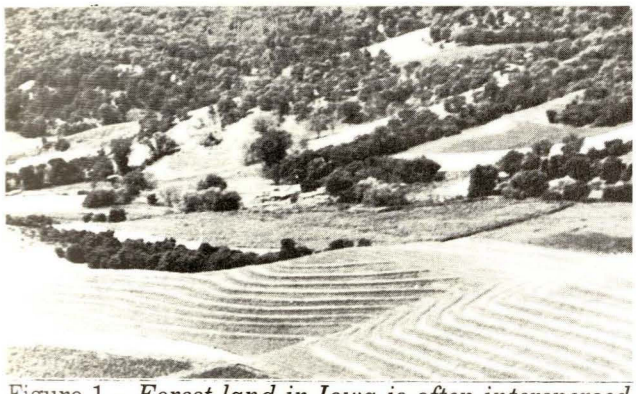

Figure 1.—*Forest land in Iowa is often interspersed with agricultural land. (Photo courtesy of Iowa Conservation Commission.)*

[1]*Published 1954 figures shown in "The forest resources of Iowa", Central States Forest Experiment Station, Forest Survey Release 22, March 1959, have been adjusted to be comparable with 1974 data because an estimated 298.2 thousand acres of land classed as commercial forest in 1954 would have been classed as wooded pasture by 1974 standards. This estimate was made by assuming the ratio of wooded pasture to commercial forest land was constant during both surveys. Published 1954 unproductive forest area (none) was adjusted to equal the 1974 unproductive area (26.7 thousand acres) because most of the 1974 field plots classed as unproductive forest were judged by the field crew to have been unproductive forest in 1954 also.*

Commercial Forest Area Plunges

Commercial forest land, which accounted for most of the forest land, plummeted from 2,297 thousand acres in 1954 to 1,459 thousand acres in 1974, a 36 percent decline. Much of this loss was due to the conversion of commercial forest to pasture and other agricultural land.

The decline in forest land has caused concern among natural resource managers in the State. As the commercial forest land base declines, total wood production will also decline unless management on the remaining forest land intensifies, thereby increasing the volume of wood produced per acre. A declining forest land base may also portend a decline in forest wildlife populations. Iowa wildlife requiring forest habitat include such popular game species as grey squirrel, white-tail deer, ruffed grouse, and wild turkey. Forest land is also valuable as a recreation resource, providing settings for picnicking, hiking, cross-country skiing, and snowmobiling.

Iowa's commercial forest land is concentrated in the eastern half of the State—the Southeastern (659 thousand acres) and Northeastern (584 thousand acres) Survey Units contain 85 percent of the commercial forest area (figs. 2 and 3). The Western Survey Unit, Iowa's largest with 43 percent of the State's land area, contains only 15 percent of the commercial forest area (215 thousand acres).

It is impossible to compare commercial forest area by unit between surveys because unit boundaries have changed and 1954 commercial forest area by county is unavailable. However, all units probably lost commercial forest land between surveys.

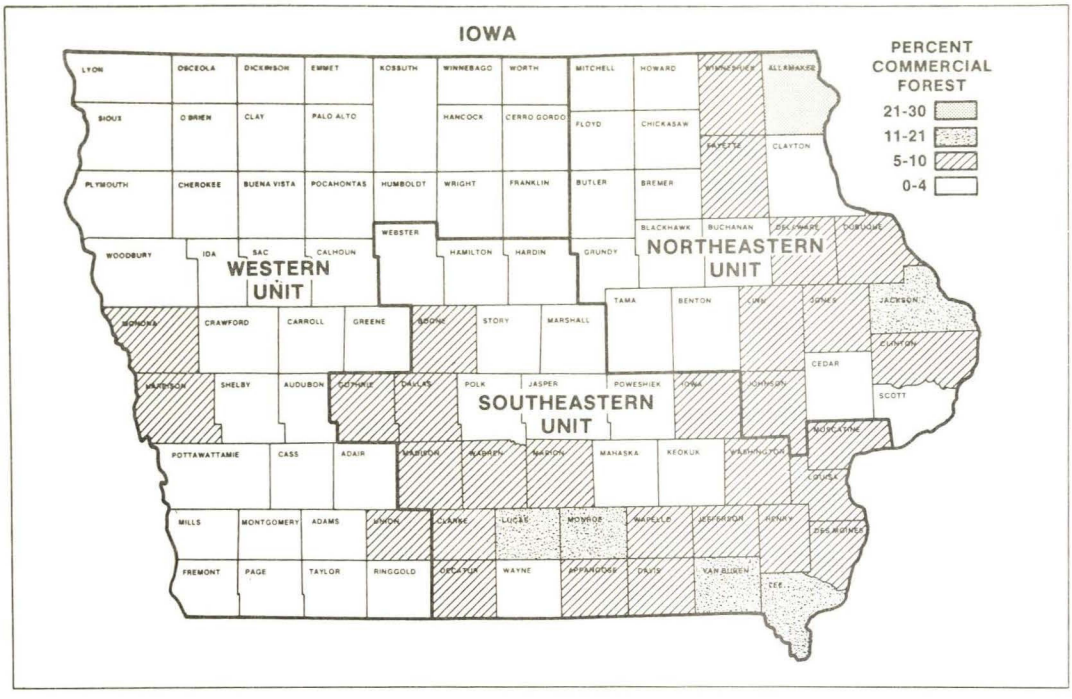

Figure 2.—*Commercial forest area as a percent of land area, by county, Iowa, 1974.*

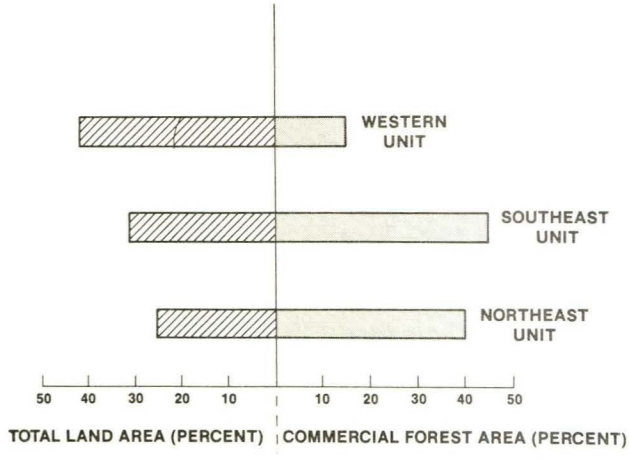

Figure 3.—*Distribution of Iowa's total land area and commercial forest area among Survey Units, Iowa, 1974.*

Topography Influences Forest Types

The surface features and landforms of commercial forest land can help determine the forest type that will occur on a site as well as the quantity and quality of timber produced. The frequency of flooding, availability of water, soil depth, nutrient movement, and micro-climate of a site are affected by topographic features.

More than one-third of Iowa's commercial forest is on level ground or on the lower one-fourth of hillsides. Most of this land is in river bottoms and on streambanks. Cottonwood and elm-ash-cottonwood types commonly occur on these sites.

An additional one-fourth of the State's commercial forest land occurs between the lower and middle portions of hillsides. The "cove effect" is a common phenomenon of the two lower topographic areas. Surrounded by protective hillsides, the micro-climate of a small valley or "cove" is relatively moist and cool. Water in the valley bottom and lower slopes is in good supply because of runoff from the higher slopes. Nutrients from the upper slopes wash down and pool in the valleys. These processes lead to deeper, richer soils with better moisture regimes in coves than on surrounding lands. The ideal growing conditions found in coves make them some of the highest quality forest sites in the State.

The distribution of acreage among topographic classes differs greatly by forest type (table 1). The eastern redcedar-hardwood, white oak-red oak-hickory, white oak, and bur oak forest types are concentrated on the upper half of slopes, but almost all of the elm-ash-cottonwood and cottonwood forest types are found on the lower one-fourth of slopes.

One-Fourth of Commercial Forest is on Good Sites

Measures of site quality describe the productivity of a site for timber production. Information regarding site quality is often required when making management decisions. If stocking levels are similar, higher quality sites will produce more wood volume per acre in a given amount of time than low quality sites. It is also common for higher quality sites to produce higher quality timber.

Two measures of site quality are commonly used—site index and site class. Site index values indicate the productivity of a site in terms of the total height reached by dominant and codominant trees at 50 years of age. Site index values vary among tree species—a site index of 40 (the dominant and codominant trees obtain a height of 40 feet in 50 years) is considered a good site for eastern redcedar but a low site for white oak. The following tabulation shows an

Table 1.—*Area of commercial forest land by forest type and topographic class, Iowa, 1974*
(In thousand acres)

Forest type	All Classes	Topographic class			
		Upper ¼ of slope	Upper mid-¼ of slope	Lower mid-¼ of slope	Lower ¼ of slope
Eastern redcedar-hardwood	34.9	9.0	17.4	—	8.5
White oak-red oak-hickory	514.8	107.9	180.7	157.7	68.5
White oak	150.1	31.8	65.4	40.0	12.9
Bur oak	148.7	16.4	69.1	41.0	22.2
Elm-ash-cottonwood	404.1	21.0	8.4	33.0	341.7
Cottonwood	12.3	—	—	—	12.3
Hard maple-basswood	143.6	24.7	46.3	56.3	16.3
Aspen	7.8	2.6	—	5.2	—
Nonstocked	42.4	12.2	10.3	—	19.9
All forest types	1,458.7	225.6	397.6	333.2	502.3

average site index range for the Midwest and the area of Iowa's commercial forest in each class.

Site index range	Description	Area of commercial forest in Iowa (Thousand acres)
55 or less	low site	550.8
56-70	average site	545.4
more than 70	high site	362.5
	TOTAL	1,458.7

Therefore, about one-quarter of Iowa's commercial forest land is classified as high site. The remaining acreage is divided equally between average and low sites.

Site classes stratify land in terms of its inherent capacity to grow crops of industrial wood. Site classes indicate the annual volume of growth per acre of fully stocked natural stands at culmination of mean annual increment. In Iowa, commercial forest land is divided among the following site classes:

Site class (Cu. ft./ac./yr.)		Area (Thousand acres)
225+		3.4
165-225		—
120-165		37.3
85-120		115.1
50-85		344.9
less than 50		958.0
	TOTAL	1,458.7

Both site index and site class measure a site's capacity to grow trees. They do not directly assess a site's capacity for producing nontimber forest resources.

Oak Types Dominate the Commercial Forest

Of the eight forest types in Iowa, the 3 oak types (white oak-red oak-hickory, white oak, and bur oak) accounted for 56 percent of the total commercial forest area—814 thousand acres (fig. 4). In 1954 the oaks were divided into only two forest types (oak-hickory and bur oak) and comprised 48 percent of the State's commercial forest (fig. 5).

The elm-ash-cottonwood type grew on 28 percent of the commercial forest (404 thousand acres). This type declined precipitately since the 1954 survey when it occupied 47 percent of the commercial area (1,219 thousand acres). Some of this type, which generally occupies fertile lowland sites, probably was converted to agricultural uses between surveys. Dutch

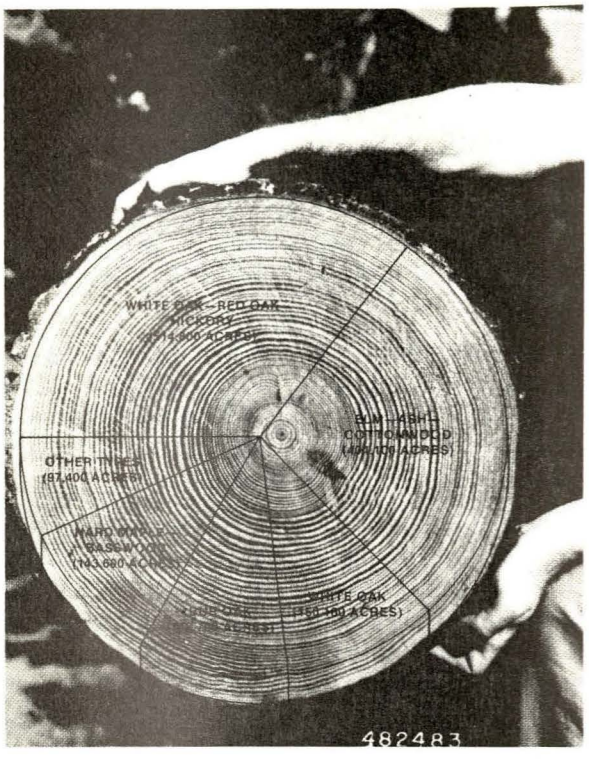

Figure 4.—*Area of commercial forest land by proportion in each forest type, Iowa, 1974.*

Figure 5.—*The area of land in oak forest types, like this white oak stand, decreased by approximately 34 percent between 1954 and 1974; however, the proportion of the total commercial area occupied by oaks increased during the same period. (Photo courtesy of Iowa Conservation Commission.)*

elm disease also killed many of the elms in this forest type, prompting some stands to be reclassified as another type in 1974.

Highly-prized black walnut was an important component of some of Iowa's forest types and is often favored in timber stand improvement treatments. In 1972 black walnut composed 47 percent of the total

veneer log and bolt production in the State. In the elm-ash-cottonwood type, State foresters have observed that when elm is eliminated from stands by disease, black walnut often moves in to replace it.

Some Oak Stands Are Over Rotation Age

In general, a forest divided equally between stand age classes is desirable in order to yield an even flow of timber products. A mix of age classes is also desirable to maintain diversity in forest wildlife populations and to provide esthetic enjoyment of the forest.

The stand-age distribution in Iowa varies by forest type, but in general, the acreage is fairly evenly distributed in age classes less than 90 years (fig 6). However, approximately 209 thousand acres of commercial forest land contain stands at or near rotation age. Rotation age is the recommended stand age for harvest according to management criteria specified in the treatment opportunities section of this report (see table 4).

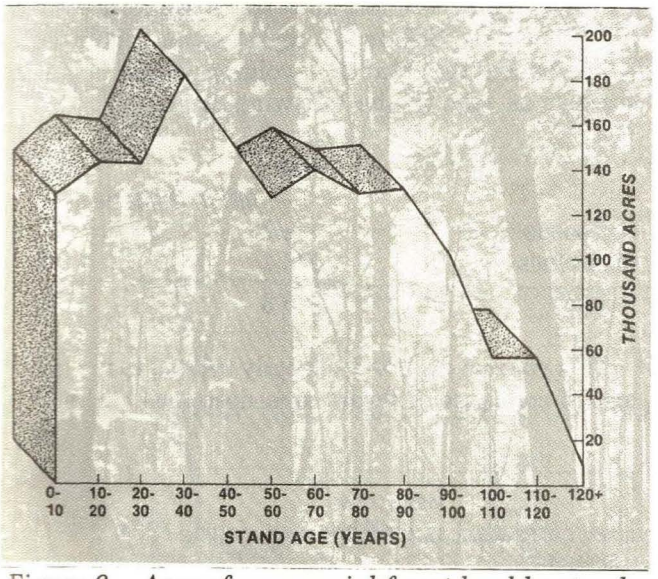

Figure 6.—*Area of commercial forest land by stand-age class, Iowa, 1974.*

Sawtimber Stands Make Up Over Half the Area

Sawtimber stands accounted for 54 percent of the commercial area (781 thousand acres). The majority of these stands were in elm-ash-cottonwood and white oak-red oak-hickory types. Poletimber stands grew on 24 percent of the area (357 thousand acres) and sapling and seedling stands on 19 percent of the forest (278 thousand acres). Nonstocked areas accounted for 3 percent of Iowa's commercial forest (42 thousand acres).

Stocking Needs to be Improved

Three-fourths of the State's commercial stands were 60 percent or less stocked with trees, putting this land in the poorly-stocked or nonstocked classes. All of the sapling and seedling stands in the State fall into these classes, suggesting a problem with regeneration. Much of the poor stocking is the result of heavy grazing in timber stands, which continues to be a major problem.

Regardless of stocking, more than half (51 percent) of the trees in Iowa were rough or rotten. The percentage is higher in the smallest and largest diameter classes—63 percent in the 2-inch diameter class and 54 percent in the greater than 29-inch diameter class (fig. 7).

Figure 7.—*Rotten cull trees take up valuable growing space and may not yield high value timber products. However, they do provide shelter for some birds and animals. (Photo courtesy of Iowa Conservation Commission.)*

Farmers Own Bulk of Commercial Forest

As shown below, farmers own two-thirds of the State's commercial forest land (987 thousand acres):

Owner	Commercial Forest Area 1974 *(Thousand acres)*
PUBLIC:	
Federal:	
National forest	0.0
Other federal	55.2
State	51.3
County and municipal	4.7
PRIVATE:	
Farmer	987.0
Forest industry	16.7
Miscellaneous	343.8
Total	1,458.7

Farmer-owned land can be characterized as small holdings of less than 100 acres. Sawtimber stands of white oak-red oak-hickory and elm-ash-cottonwood frequently occur on farmer-owned land.

Miscellaneous private owners control the second largest block of commercial forest land in Iowa. Almost one-half of the parcels of commercial forest land in this ownership class are less than 50 acres in size (table 2). All of the large holdings in the miscellaneous private category are owned by corporations. Most of the stands are composed of sawtimber-size trees with white oak-red oak-hickory the most common forest type.

The 111 thousand acres of public-owned commercial forest land are principally made up of large holdings. Public land is usually occupied by sawtimber-size stands, and elm-ash-cottonwood is the major forest type. The productive potential of public commercial forest land is 45 percent higher than the State's average.

Iowa's 17 thousand acres of forest industry land are located entirely in the Northeastern and Southeastern Forest Survey Units. Most (86 percent) of this land is in holdings larger than 500 acres. White oak-red oak-hickory occurs frequently in this ownership class.

Inventory Volume Drops 22 Percent

The volume of growing stock on commercial forest land dropped from 1.3 billion cubic feet in 1954 to 1.1 billion in 1974, a 22 percent decline. Hardwoods, which comprised almost all of the volume, accounted for the decline. Softwoods, representing a miniscule 0.5 percent of the total 1974 volume, gained between surveys as seen in the following tabulation:

	1954	1974
	—(million cubic feet)—	
Softwoods	3.7	5.8
Hardwoods	1,345.1	1,048.9
Total	1,348.8	1,054.7

This volume decline is directly related to the large loss of commercial forest area described earlier.

Table 2.—*Area of commercial forest land by owner class and size of holding, Iowa, 1974*
(In thousand acres)

		Size of holding (acres)					
Owner class	Total	0-50	50-100	100-500	500-2500	2500-5000	5000+
Public	111.2	—	—	—	5.9	8.4	96.9
Private							
Forest industry	16.7	0.1	0.1	2.2	1.8	2.5	10.0
Farmer	987.0	368.3	361.3	255.3	2.1	—	—
Miscellaneous:							
Individual	304.9	143.4	94.3	51.5	15.7	—	—
Corporation	38.9	3.2	3.8	6.6	8.4	5.9	11.0
TOTAL	1,458.7	515.0	459.5	315.6	33.9	16.8	117.9

Growing-stock volumes are nearly equal in the Northeastern Unit (460 million cubic feet) and the Southeastern Unit (462 million) but are considerably smaller in the Western Unit (133 million).

Five of the six counties with the greatest volume of growing stock in the State are in the Northeastern Unit (fig. 8): Allamakee (85 million cubic feet), Clayton (67 million cubic feet), Jackson (43 million cubic feet), Winneshiek (32 million cubic feet), and Dubuque (28 million cubic feet). The other county in the top six is Lee County (33 million cubic feet) in the Southeastern Unit.

Volumes per acre averaged 723 cubic feet over the entire State in 1974 compared with 587 cubic feet in 1954. This increase occurred because some of the commercial forest land lost between surveys was of low productivity, forest management has improved, and some undesirable forest practices may be moderating—such as the heavy grazing found on 27 percent of the forest land during the 1954 survey that left no young growth in the stands. The highest average volume per acre is in the Northeastern Unit—787 cubic feet.

Hardwoods, Chiefly Oaks, Account for Most Volume

Hardwoods account for virtually all of the 1.1 billion cubic feet of growing-stock volume in 1974. Softwoods, chiefly eastern redcedar, represent a negligible but expanding part of the resource. The oaks dominate with 403 million cubic feet, 38 percent of the hardwood volume. White oak (148 million) and northern red oak (126 million) account for the bulk of the oak volume. Soft maple (110 million cubic feet), elm (95 million), cottonwood (92 million), and hickory (79 million) are other species with large volumes.

Significant increases in volume between surveys were made by the hickories (27 percent gain) and white oak (15 percent gain). Substantial declines were registered for other white oaks[2] (22 percent loss), cottonwood (22 percent loss), basswood (29 percent loss), and other red oaks (32 percent loss). The volume of highly sought-after black walnut dropped 38 percent, and elm volume plummeted 67 percent—the result of Dutch elm disease.

[2]*Other white oaks include swamp white, bur, chinkapin, overcup, and post oaks. See Principal Tree Species in Iowa in Appendix for composition of other species groups.*

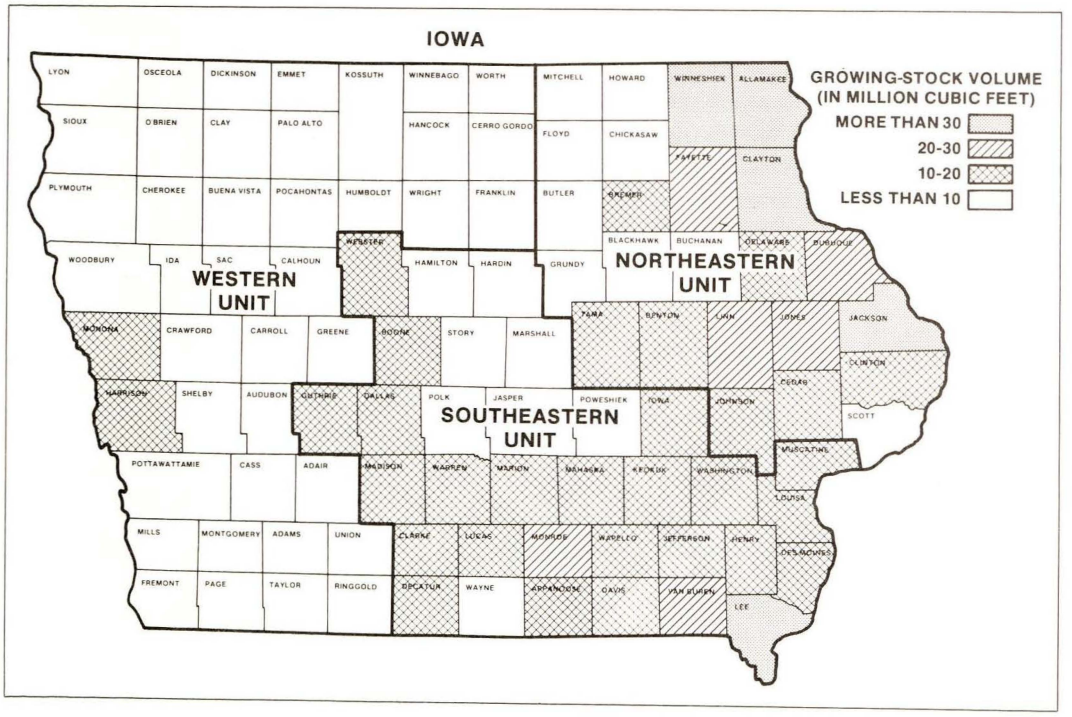

Figure 8.—*Growing-stock volume in Iowa counties, 1974.*

Growing-stock volumes increased in the 6- and 8-inch diameter classes but dropped in all other classes (fig. 9). The drop was most pronounced in the largest diameters. Volumes in the 20-inch and larger class fell 42 percent between surveys, and volume in the 18-inch class sank 35 percent because more of these trees were removed from the inventory than were replaced by ingrowth from smaller diameter classes. Fifty-one percent of the growing-stock volume was in trees 15 inches d.b.h. and larger in 1954, compared with only 41 percent in 1974. The obvious implications are that large diameter trees will be even fewer in the near future and that forest industries will have to adjust to a somewhat smaller average tree size.

Private Nonindustrial Owners Account for 88 Percent of Volume

Farmers own 63 percent of the growing-stock volume, although they own 68 percent of the commercial forest area. Other private nonindustrial owners account for 25 percent of the volume (24 percent of commercial area). Public agencies own 11 percent of the volume (7 percent of area) and forest industries own 1 percent of the volume (1 percent of area). All of the softwood volume is owned by farmers (88 percent) and other private nonindustrial parties (12 percent).

One-third of the growing-stock volume is in species of the white oak-red oak-hickory forest type and one-third is in species of the elm-ash-cottonwood type. The other one-third of the volume is scattered among the remaining forest types.

In addition to the 1,054.7 million cubic feet in growing-stock trees discussed heretofore, the inventory includes 308.4 million cubic feet of timber in trees failing to qualify as growing stock because of species, poor form, or internal decay. Rough and rotten trees account for 73 percent of this largely unused nongrowing-stock volume. Short-log trees (27 percent) and salvable dead trees (less than 1 percent) make up the rest of this volume. Although unsuited for many high-value timber products, nongrowing-stock trees are used for firewood and other products and are a potential source of additional wood fiber when expanded markets are developed.

Black Walnut Volume Drops 38 Percent Between Surveys

Black walnut, a species of particular importance in Iowa because of its' high value, intense demand, and shrinking supply, experienced a sharp drop in growing-stock volume between surveys. Walnut volume on commercial forest land in 1954 was 51.5 million cubic feet but in 1974 it was only 31.8 million (fig. 10).

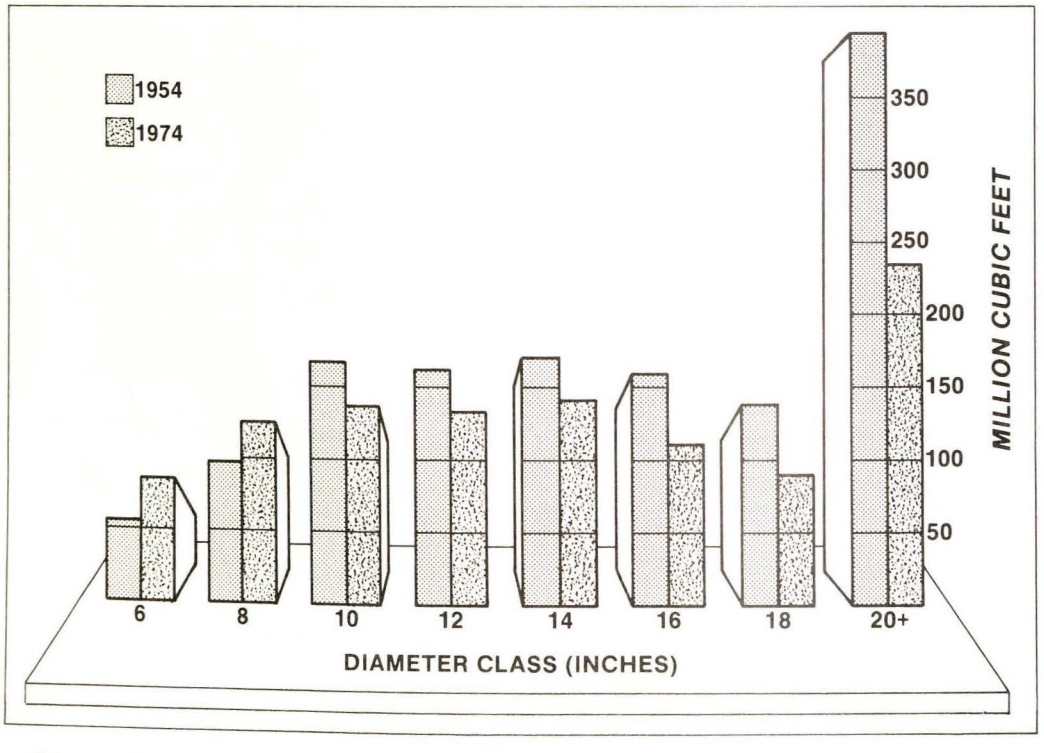

Figure 9.—*Volume of growing stock by diameter class, Iowa, 1954 and 1974.*

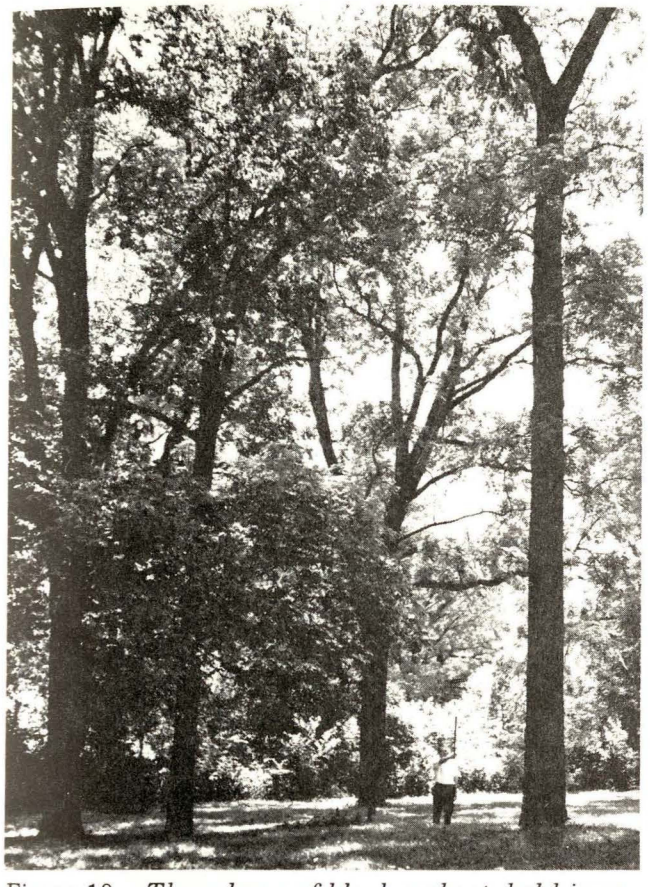

Figure 10.—*The volume of black walnut, held in esteem throughout the world by those who use and appreciate fine hardwoods, is declining in Iowa. Walnut volume on commercial forest land fell 38 percent between 1954 and 1974. (Photo courtesy of Iowa Conservation Commission.)*

Black walnut nongrowing-stock trees on commercial forest land account for an additional 6.3 million cubic feet.

Another 6.0 million cubic feet of black walnut grows on nonforest land in the State as shown in the following tabulation:

Tree class	Black walnut live tree volume *(Thousand cubic feet)*
On commercial forest land:	
Growing-stock trees	31,823
Rough and rotten trees	3,984
Short-log trees	2,313
All tree classes	38,120
On nonforest land:	
Growing-stock trees	3,205
Rough and rotten trees	2,414
Short-log trees	366
All tree classes	5,985

Much of the black walnut volume, especially that on nonforest land, is in highly scattered trees. Trees may be found singly in pastures, fields, and along fence rows.

Sawtimber Volume Down One-Third

The inventory of growing stock includes 3.5 billion board feet of sawtimber, down 30 percent from 1954. This is a sharper decline than that for total growing-stock inventory—22 percent—and is probably caused by heavier cutting in the larger diameter classes. As in the case of growing-stock inventory, softwood sawtimber volume increased between surveys:

	1954	1974
	—(Million board feet)—	
Softwoods	6	11
Hardwoods	4,946	3,475
Total	4,952	3,486

The largest sawtimber volumes are generally found in the same counties that the largest growing-stock volumes are found. Sixty-one percent of the sawtimber volume was in trees 15 inches d.b.h. and larger in 1974, compared to 70 percent in 1954. Average volume per acre in 1974 was 2,390 board feet, compared to 2,156 in 1954. Fifty-seven percent of the sawtimber volume in 1974 was in the two log grade classes at the low end of the four class quality scale.

In 1974, 88 million board feet of black walnut in sawtimber trees grew on commercial forest land in the State—down 100 million board feet from 1954. Additionally in 1974, 7 million board feet of walnut in short-log trees grew on commercial forest land. Also, 16 million board feet of walnut in sawtimber trees and 1 million in short-log trees grew on nonforest land in 1974.

Growth Rate is 3.9 Percent

Net annual growth of growing-stock trees in Iowa in 1973 totaled 41 million cubic feet, or 28 cubic feet/acre.

The 1973 growth rate was 3.9 percent of inventory. The growth rate for softwoods (4.2 percent) was slightly higher than that for hardwoods (3.9 percent), and the growth rate on public land (5.6 percent) was slightly higher than that on other land (3.7 percent).

The white oaks produce the largest volume of growth (16 percent of the total growth) followed by soft maple (15 percent), red oak (12 percent), and cottonwood (11 percent).

Net annual growth of sawtimber in Iowa was 80 million board feet in 1973, 2.3 percent of inventory. Select white oaks, cottonwood, and soft maple accounted for more than 66 percent of the total volume.

Mortality of growing-stock trees amounted to 7 million cubic feet in 1973, or 0.7 percent of inventory. The mortality rate for softwoods (0.9 percent) was slightly higher than for hardwoods (0.7 percent). Rate of mortality was significantly lower on public (0.2 percent) than on private-owned commercial forest (0.7 percent).

Disease caused 87 percent of the mortality volume in the State. Dutch elm disease was one of the most active—elm mortality accounted for 62 percent of the total mortality volume.

Annual sawtimber mortality was 26 million board feet in 1973, 0.7 percent of inventory.

Adding the volume of net annual growth (41 million cubic feet) to the volume of mortality (7 million) provides an estimate of gross growth for the State (48 million). Net growth was, therefore, 86 percent of gross growth (fig. 11).

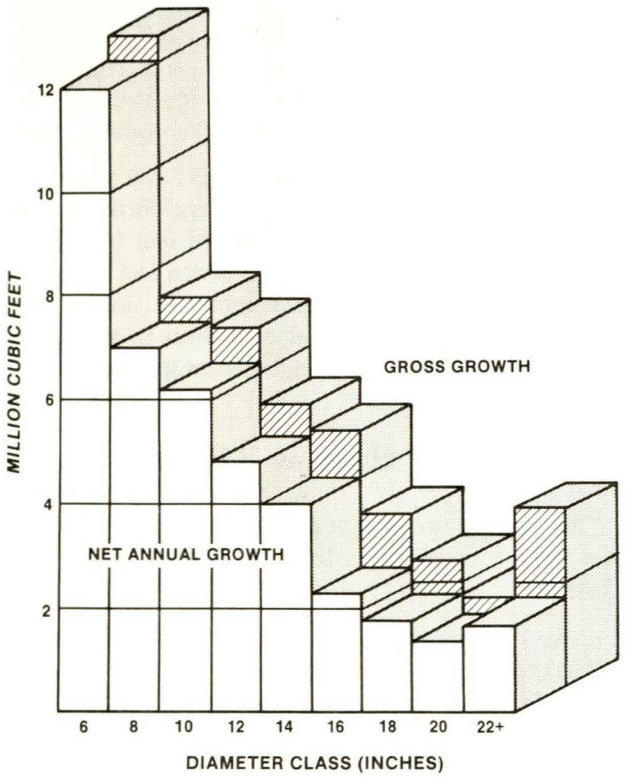

Figure 11.—*Gross annual growth and net annual growth of growing stock by 2-inch diameter class, Iowa, 1973. The difference between gross annual growth and net annual growth is annual mortality.*

Potential Growth is 51 Cubic Feet Per Acre

A rough estimate of the potential net annual growth (or productive potential) of Iowa's commercial forests can be made using site class data from the Iowa survey. As mentioned earlier, site class values indicate the annual volume of growth per acre of fully-stocked natural stands at culmination of mean annual increment. By multiplying the area in a site class by the midpoint of the growth range in each class, an estimate of the State's productive potential can be obtained (table 3). This is a simplistic measure of potential growth because it does not take into account the present distribution of age classes or the obvious differences in growth among them. The results, therefore, probably overestimate the true potential. Spurr and Vaux took 90 percent of an estimate of potential growth for the Nation as being realistic.[3] A recent study of the aspen type in Wisconsin suggests that potential growth is 52 percent higher than current growth.[4]

Table 3.—*Estimation of potential net annual growth on commercial forest land, Iowa, 1973*

Site class Cubic ft./ acre/year	Area of commercial forest land	Potential[1] net growth per acre	Total potential net growth
	Thousand acres	*Cubic ft./ acre/year*	*Thousand cubic feet/year*
225+	3.4	235.0	799.0
225-165	—	195.0	—
165-120	37.3	142.5	5,315.3
120-85	115.1	102.5	11,797.8
85-50	344.9	67.5	23,280.7
20-50	958.0	35.0	33,530.0
TOTAL	1,458.7	—	74,722.8

[1]Midpoint of site class interval.

[3]*Spurr, Stephen H., and Henry J. Vaux. 1976. Timber: biological and economic potential. Science 191 (4228):751-756.*

[4]*Lundgren, Allen L., and Jerold T. Hahn. 1978. The extent and characteristics of low productivity aspen areas in Wisconsin. U.S. Department of Agriculture Forest Service, General Technical Report NC-45, 24 p. U.S. Department of Agriculture Forest Service, North Central Forest Experiment Station, St. Paul, Minnesota.*

Using this method, the potential net annual growth for Iowa is 75 million cubic feet, or 51 cubic feet per acre. The productive potential of publicly owned forests (74 cubic feet per acre) is higher than the potential of miscellaneous private (51 cubic feet per acre), farmer (49 cubic feet per acre), or forest industry (48 cubic feet per acre) owned forests. In the Northeastern Survey Unit the productive potential is slightly higher than in the Southeastern and Western Units. Assumptions behind this estimate of potential net growth include: (1) all commercial forest land is fully stocked; (2) age classes are evenly distributed; (3) no intermediate cuttings of growing-stock trees occur prior to final harvest; and (4) harvest occurs at culmination of mean annual increment.

Potential growth could be further increased if management were expanded to include more intensive cultural operations such as weeding, thinning, planting of genetically superior stock, or fertilizing.

The percent of potential net growth that occurs in the higher site classes is greater than the percent of commercial area in these site classes (fig. 12). The reverse is true for the poorer site classes. This dramatizes the economic truism that if management costs vary little with changes in site quality, returns from investments in forest management will be greatest on lands with the highest site quality.

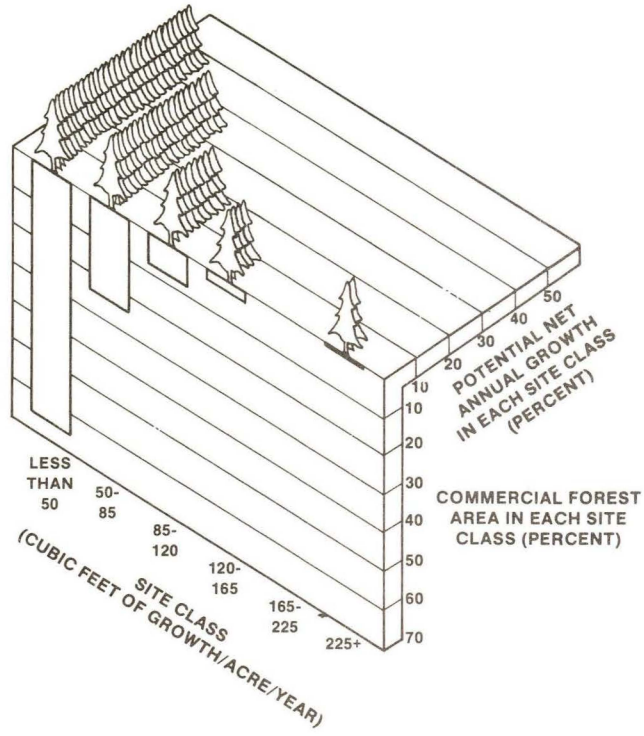

Figure 12.—*Distribution of commercial forest area and potential net annual growth by site class, Iowa, 1973.*

Timber Removals Rate is 5.4 Percent

Timber removals from growing stock in 1973 totaled 50.3 million cubic feet but the net annual growth was only 41.3 million cubic feet. Prolonged imbalance of removals over growth, obviously, leads to a declining inventory. It is impossible to say how long removals have exceeded growth because the 1954 survey of Iowa made no estimate of "other" removals.[5] But the 30-year projections of Iowa's timber resource discussed later assume that removals will exceed growth during the entire period.

Only 26 percent of total removals (13.2 million cubic feet) was utilized for roundwood products (fig.13), 71 percent (35.4 million cubic feet) was "other" removals, and the remaining 3 percent (1.7 million cubic feet) was logging residues.

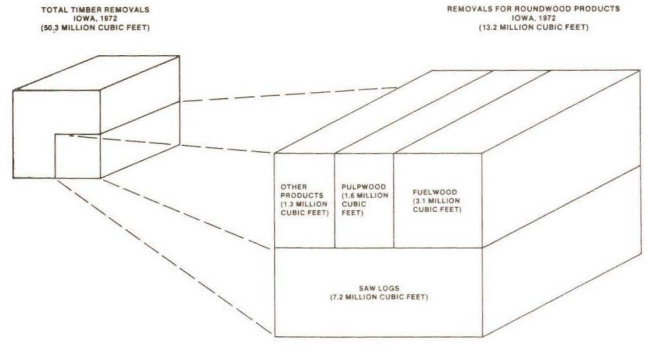
TOTAL TIMBER REMOVALS IOWA, 1972 (50.3 MILLION CUBIC FEET)
REMOVALS FOR ROUNDWOOD PRODUCTS IOWA, 1972 (13.2 MILLION CUBIC FEET)
OTHER PRODUCTS (1.3 MILLION CUBIC FEET)
PULPWOOD (1.8 MILLION CUBIC FEET)
FUELWOOD (3.1 MILLION CUBIC FEET)
SAW LOGS (7.2 MILLION CUBIC FEET)

Figure 13.—*Growing-stock timber removals and components of roundwood products removals, Iowa, 1973.*

Fifty-four percent of the removals utilized for products was used for saw logs (fig.14). Fuelwood (24 percent) and pulpwood (12 percent) accounted for other large products removals volumes.

Almost all of the total removals volume (99 percent) came from farmer and miscellaneous private-owned land.

[5] *"Other" removals are trees removed but not utilized for products or trees left standing but "removed" from the commercial land classification by land-use change.*

Figure 14.—*Red oak saw logs, like this one being skidded to a landing, are used primarily for railroad ties and furniture in Iowa. (Photo courtesy of Iowa Conservation Commission.)*

The oak species made up the largest portion (28 percent) of growing-stock volume removed for products in 1973. Most of the remaining volume was comprised of elm, cottonwood, soft maples, and ash.

Sawtimber removals totaled 163.3 million board feet in 1973. Thirty-eight percent (61.7 million board feet) of the removals was for products, 60 percent (98.7 million board feet) was "other" removals, and 2 percent (2.9 million board feet) was logging residues.

Two-thirds of the sawtimber removals for products was saw logs.

One-fourth of the sawtimber volume removed for products was oak. Hard and soft maples, cottonwood, basswood, hickory, and black walnut accounted for one-half of the volume harvested.

TIMBER PRODUCTS OUTPUT

Output of Roundwood Products in 1972 was 22.9 Million Cubic Feet

Total output of timber products from Iowa forests in 1972[6] amounted to 26.4 million cubic feet. Output from roundwood made up most of the total, 22.9 million, and plant byproducts contributed the remaining 3.5 million. Roundwood production fell 37 percent from 1953 when it was 36.6 million cubic feet. A drop in fuelwood production from 24.0 million cubic feet in 1953 to 9.8 million in 1972 was the major reason for the decline.

Wood-using industries[7] employed 9,200[8] persons in 1972 (4.3 percent of all employees of manufacturing firms in the State) in 220 establishments. These figures include both primary and secondary manufacturing plants. These industries met a payroll of $74.0 million in 1972 (3.6 percent of the State total), and made new capital expenditures of $13.4 million (4.1 percent of State total). The value added to Iowa's economy by the manufacture of wood and paper products was $162.0 million in 1972 (3.4 percent of State total).

Four timber products dominate in Iowa (fig. 15)—fuelwood (39 percent of total output of timber products), saw logs (34 percent), pulpwood (16 percent), and veneer logs (4 percent).

Fuelwood Accounts for Largest Share of Output

The total output of fuelwood in 1972, 10,199 thousand cubic feet, was greater than that of any other timber product. Practically all of this was in hardwood species—largely elm and ash. Roundwood accounted for 96 percent of the total fuelwood output (9,796 thousand cubic feet) and plant byproducts made up the remaining 4 percent (403 thousand).

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[6]*Timber products output information is dated 1972 rather than 1974 because the independent study that provided output information was conducted in 1972.*

[7]*U.S. Bureau of Census, Standard Industrial Code (SIC) 24, Lumber and Wood Products; and SIC 26, Paper and Allied Products.*

[8]*1972 Census of Manufactures, MC72(3)-16.*

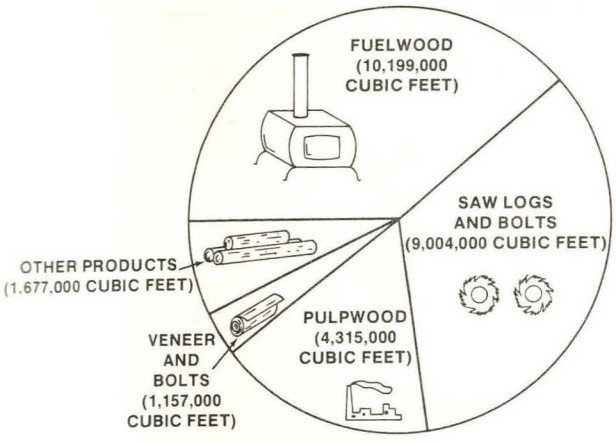

Figure 15.—*Total output of timber products by product, Iowa, 1972.*

Two-thirds of the roundwood volume was from nongrowing-stock material—cull trees, salvable dead trees, noncommercial species, sapling-size trees, and limbwood.

Fuelwood cut from roundwood in 1972 amounted to only 41 percent of the 1953 fuelwood volume. However, fuelwood production from roundwood is likely to rise significantly in the future, in light of the current energy crisis.

Sawmills Produced 56 Million Board Feet of Lumber in 1972

The 60 active sawmills in Iowa in 1972 (fig. 16), representing 92 percent of the primary wood-using plants in the State, received 59.6 million board feet of saw logs. This was an increase of 15.2 million board feet from saw log receipts in 1969. Other States, primarily Missouri, Illinois, and Wisconsin, provided 15 percent of the receipts. Iowa sawmills produced 56 million board feet of lumber in 1972. Since 1941 the State's annual lumber production has ranged between 43 and 91 million board feet.

Although the number of active sawmills in the State has declined dramatically since 1953 when there were approximately 1,000 mills, the average annual lumber production per mill has risen just as dramatically (fig. 17).

In 1972 loggers harvested 53.5 million board feet of saw logs in Iowa, an increase of 14 percent from 1969. The Northeast Unit provided 57 percent of the saw log volume. Most of the saw logs were sent to Iowa sawmills (50.6 million board feet). Those shipped out-of-State were primarily black walnut and went chiefly to Missouri, Minnesota, and Kansas.

Red oak accounted for more saw log volume harvested (11.1 million board feet) than any other species and was followed by cottonwood (10.8 million), elm (7.8 million), and white oak (6.5 million) (fig. 18). About 80 percent of the saw log volume was produced from growing stock; the remainder was produced from nongrowing stock.

Trend of Pulpwood Production is Up

Iowa pulpwood production in 1972 was 54,618 cords—30,899 cords from roundwood and 23,719 cords from plant byproducts. Total pulpwood production was up considerably from the 3,200 cords reported in 1953 and the 22,461 cords reported in 1961. No plant byproducts were pulped in either 1953 or 1961.

Modifications in pulping and sawmill technology have enabled pulp facilities to utilize plant byproducts, thus increasing the amount of available fiber without increasing harvest levels. Prior to 1962, all pulpwood in Iowa came from roundwood. By 1972, however, 21 percent of the total pulpwood production was from softwoods that came from secondary wood-using plants, such as millwork plants. The hardwood byproducts used as pulpwood were primarily sawmill slabs and edgings.

Other modifications in technology have made it possible to use increasing amounts of hard hardwoods (i.e., oaks, hickories, white ash, green ash, and sugar maple) as pulpwood (fig. 19). The total production of pulpwood from hard hardwoods increased from 4,000 cords in 1956 to 20,837 cords in 1972. During the same period pulpwood production from soft hardwoods (i.e., cottonwood, American elm, basswood, and silver maple) fell from 15,000 to 10,062 cords.

Iowa boasts two pulpmills with a combined pulping capacity of about 230 tons per 24 hours. Both are located along the eastern edge of the State.

Veneer Log Production Declines

Of the 5.2 million board feet of veneer logs produced in Iowa during 1972, only 1.2 million were peeled at the State's two veneer mills. The rest was shipped out-of-State, primarily to mills in Wisconsin (1.5 million board feet), Indiana (0.5 million), and foreign countries (1.2 million).

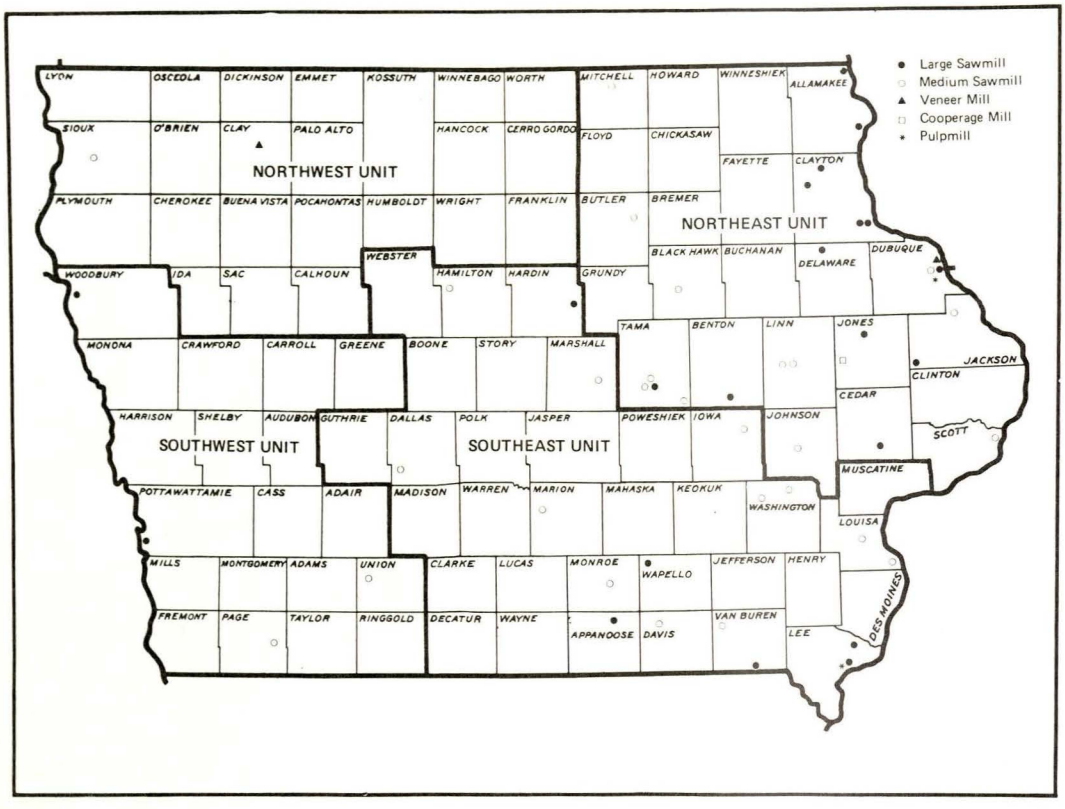

Figure 16.—Primary wood-using plants in Iowa, 1972. Sawmills are classed by volume of lumber produced in 1972: large = more than 1 million board feet; medium = 0.101 to 1.000 million board feet (smaller sawmills not shown).

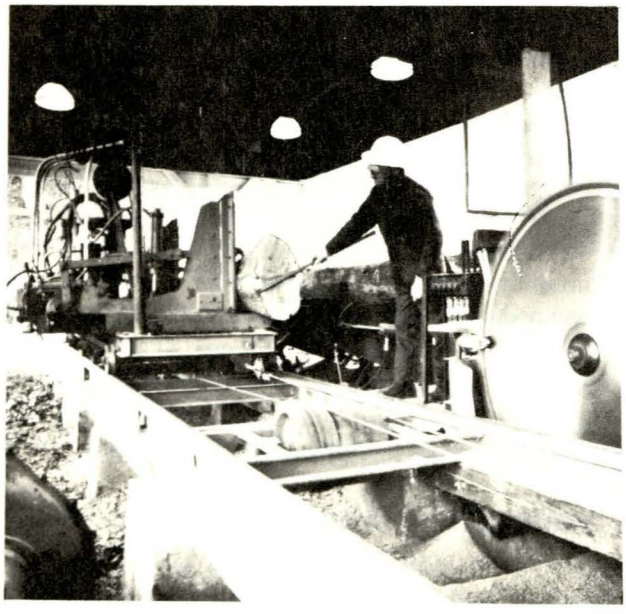

Figure 17.—*In 1953 the average lumber production per mill was less than 65 thousand board feet but by 1972 it had jumped to 927 thousand board feet. (Photo courtesy of Iowa Conservation Commission.)*

Figure 18.—*Saw log production by major species, Iowa, 1972.*

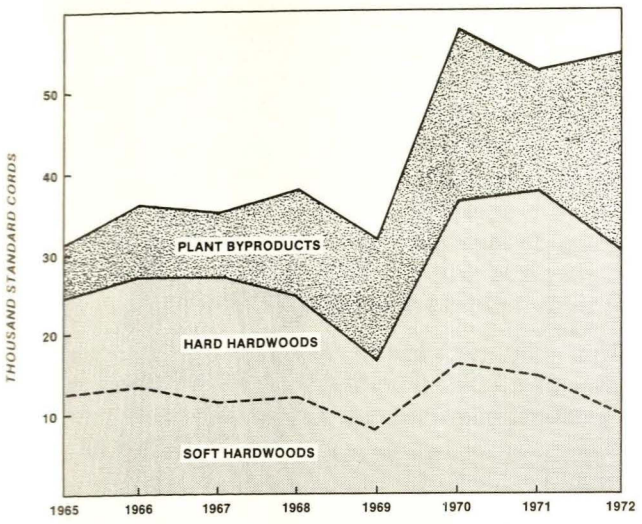

Figure 19.—*Pulpwood production from roundwood by soft hardwoods and hard hardwoods, and from plant products, Iowa, 1965-1972.*

The 1972 harvest of veneer logs (5.2 million board feet), which contains the volume of black walnut logs exported overseas, was 42 percent lower than the 1960 harvest (8.9 million), which did not include walnut export volume. The volume of veneer logs produced from almost all species has declined during the last decade. The percentage decrease in the volume of cottonwood and soft maple veneer logs harvested has been especially sharp. Black walnut, which accounted for almost half of the 1972 veneer log output, has contributed a generally declining volume harvested during the last decade. A notable exception to the above decline is the harvest of hickory. Hickory was not used for veneer in Iowa until the mid-1960's. By 1972, however, it comprised 11 percent of the volume of veneer logs produced.

Fence posts, cooperage logs, mine timbers, farm timbers, mulch, and livestock bedding are also produced in Iowa.

FUTURE TIMBER SUPPLY

A recent projection of national demand for hardwood roundwood shows a near doubling of the 1970 consumption of 3.0 billion cubic feet to 5.9 billion by 2000.[9] Relative wholesale prices of timber products throughout the projection period are assumed to be 15 percent higher for miscellaneous products and fuelwood and 10 percent higher for paper and board than 1970 average prices. This projection, made at a medium level of population and economic growth, was one of three made with different sets of price assumptions.[10] When the excess of projected hardwood imports over exports is subtracted from the projected demand in 2000, the result is a demand on United States forests of 5.6 billion cubic feet.

Projected national supplies of hardwood roundwood are estimated to increase from 2.9 billion cubic feet in 1970 to 7.4 billion in 2000.[11] This is a technical potential assuming no problems with operability or availability and, therefore, may not be realized. The projected supply of hardwood, then, exceeds demand on United States forests in 2000 by 1.8 billion cubic feet. This favorable supply outlook, however, is clouded by problems of timber quality, size, and availability.

Although Iowa's timber resource will not play a big role in affecting the Nation's future timber supply or demand, a comparison of the State's future timber situation with the Nation's is in order. Also, a look at what is likely to happen to Iowa's timber stands in the future under several levels of removals is a useful tool for resource planners and others who are able to modify forest practices.

To this end, two computer-generated projections of the State's timber resource were made. One assumed a continuation of recent levels of timber removals (low removals option), and the other assumed a higher level of removals (high removals option). Both

[9] *U.S.Department of Agriculture, Forest Service. 1977. The Nation's renewable resources—an assessment, 1975. Forest Resource Report No. 21, 243 p.*

[10] *Other projections were made based on the assumptions that: (1) 1970 wholesale prices of timber products relative to average wholesale prices of all commodities and to most competing materials would remain at 1970 levels, and (2) relative wholesale prices would rise above 1970 trend levels as follows—lumber-1.5 percent per year; plywood, miscellaneous products, and fuelwood-1.0 percent per year; and paper and board-0.5 percent per year.*

[11] *Projections of supply are defined as the amount of timber that would be available for harvesting if: (1) forestry programs continued at 1970 levels, (2) timber removals in the East changed on a straight line basis from actual removals in 1970 to a balance with growth in the year 2000 and thereafter, (3) removals on private land in the West followed trends suggested by recent management and operating practices, and (4) allowable cuts on public land remained at the 1970 level.*

projections were made for all species, rather than separate projections for softwoods and hardwoods, because of the extremely small volume of softwoods. A stand projection technique[12] was used involving input of number of trees, radial growth, mortality rates, and removal rates, all by 2-inch diameter classes, along with assumed total removals by year and assumed ingrowth into the 2-inch d.b.h. class.

Assumptions common to both low and high removals options were: (1) total area of commercial forest land between 1974 and 2004 will decrease from 1,458.7 to 1,251.0 thousand acres, an average annual rate of loss of 0.475 percent; (2) radial growth will decline in relation to the increase of basal area per acre of trees; (3) intensity of forest management will continue at the rate indicated by recent trends; and (4) volume of "other" removals will drop during the period as more trees are utilized that formerly were cut but not used.

Low Removals Option Projection

Under the low removals option, total timber removals are assumed to decrease at an average annual rate of 0.789 percent or 397 thousand cubic feet. Yet growth is projected to be lower than removals throughout the period and to decrease at an average annual rate of 0.331 percent or 137 thousand cubic feet. Therefore, inventory is projected to decline at an average annual rate of 0.389 percent or 4.1 million cubic feet. Total removals are projected to be lower in every year of the period than for the high option, and inventory, growth, and mortality volumes are all projected to decline less rapidly than in the high option.

This projection shows removals declining from 50.3 million cubic feet in 1973 to 38.4 million in 2003 (fig. 20). Removals for the major roundwood products—saw logs, veneer logs, pulpwood, and fuelwood—are assumed to rise during the period, but more of these products are assumed to be recovered from what was formerly "other" removals. The resulting sharp drop in "other" removals translates into a net decline in total removals.

Growth is projected to decline from 41.3 million cubic feet in 1973 to 37.2 million in 2003. Growth and removals begin the projection period with an excess

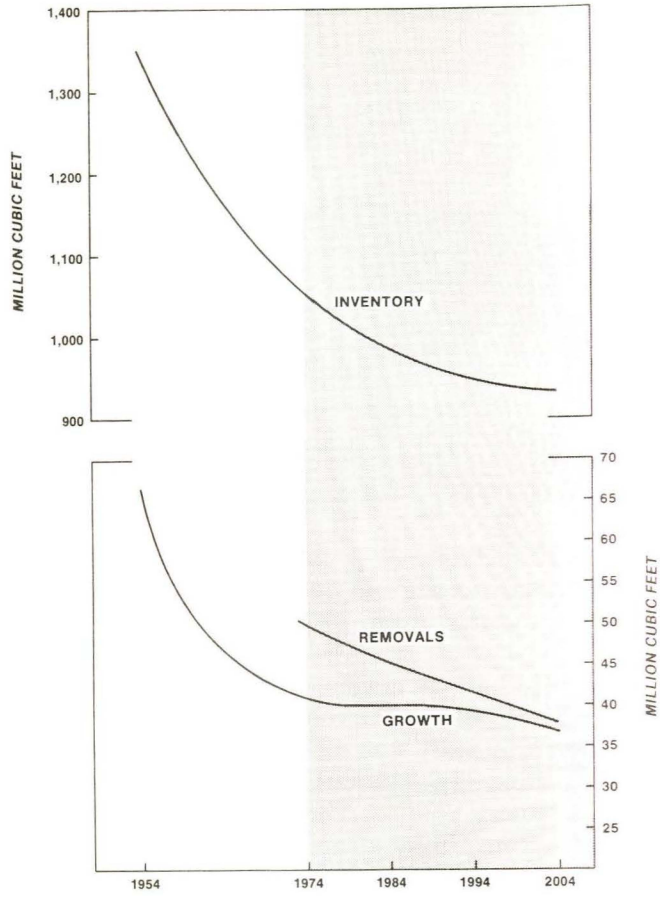

Figure 20.—*Removals, net growth, and inventory of growing stock in Iowa, 1954 and 1974, and low removals option projections for 1984-2004. Timber removals information is not available prior to 1974, and therefore, cannot be graphed. Only timber cut (which does not include logging residues and other removals) was published in 1954.*

of removals of 9.0 million cubic feet, but quickly move toward each other, ending the period separated by a removals excess of only 1.2 million cubic feet.

Inventory is projected to decline from 1,054.7 million cubic feet in 1974 to 931.7 million in 2004, a 12 percent drop. The inventory curve moderates its' downward plunge and begins to flatten out as growth and removals converge toward the end of the projection period.

High Removals Option Projection

Under the high removals option, timber removals are assumed to decrease at an average annual rate of 0.398 percent or 200 thousand cubic feet, which is

[12] *U.S. Department of Agriculture Forest Service. 1970. TRAS, a computer program for the projection of timber volume. U.S. Department of Agriculture, Agriculture Handbook 377, 24 p.*

about half the rate of decrease of the low removals option. Growth, which continuously trails removals throughout the period, is projected to sink at an average annual rate of 0.694 percent or 287 thousand cubic feet. The growth and removals curves roughly parallel each other for the first 2 decades of the projection period but then begin to diverge during the last decade (fig. 21). The wide imbalance of removals over growth causes inventory to sink at an average annual rate of 0.887 percent or 9.4 million cubic feet.

Removals are projected to dip from 50.3 million cubic feet in 1973 to 44.3 million in 2003, a 12 percent decline. Removals for major roundwood products are assumed to increase during the period and to rise faster than for the low removals option. Some of these products are assumed to be utilized from what was formerly "other" removals, but not as much as for the low removals option. Therefore, "other" removals declines at a slower rate in this option than in the low removals option.

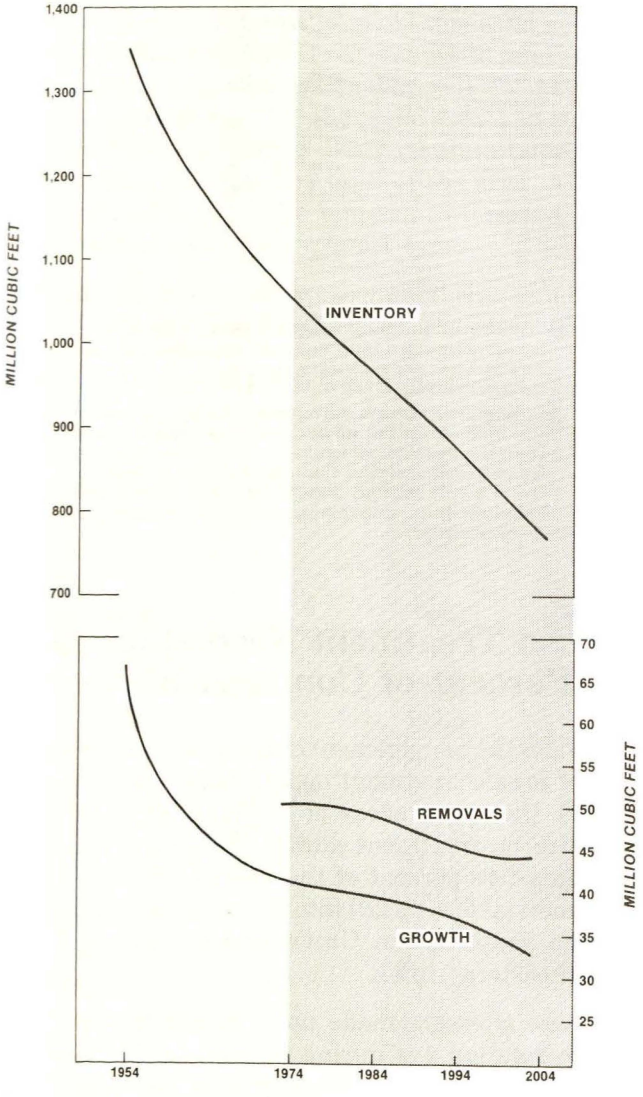

Figure 21.—*Removals, net growth, and inventory of growing stock in Iowa, 1954 and 1974, and high removals option projections for 1984-2004. Timber removals information is not available prior to 1974, and therefore, cannot be graphed. Only timber cut (which does not include logging residues and other removals) was published in 1954.*

The 41.3 million cubic feet in 1973 is projected to fall to 32.7 million in 2003, a 21 percent drop. Growth trailed removals by 9.0 million cubic feet at the beginning of the projection period, but the gap has widened to 11.6 million by the end of the period.

Given the above conditions of a wide and growing imbalance of removals over growth, in addition to a declining commercial forest area, inventory is projected to plummet from 1,054.7 million cubic feet in 1974 to 773.9 million in 2004, a loss of 27 percent.

Implications of the Projections

The low and high removals options probably prescribe the bounds of the status of Iowa's timber resource for the next 3 decades, with the actual situation falling between the two. Projections for the first decade are the most meaningful because of the uncertainty of assumptions closely related to quickly changing economic conditions.

Inventory, then, is likely to continue its downward trend in Iowa but the magnitude of the fall is dependent on several factors. If commercial forest land is taken out of production at a lower rate than assumed for the projections, inventory will mitigate its downward slide somewhat. Or if most of the commercial forest converted to other uses is of low site quality, the same effect would be exerted on inventory.

The projections assumed no change from recent trends in the level of forest management throughout the projection period. However, management activities are likely to rise and if they do, the projections will prove to be conservative.

The destiny of Iowa's timber resource lies in the hands of the State's nonindustrial private landowners, who control 91 percent of the commercial forest land. If the level of forest management is to rise appreciably or if the inventory loss is to be slowed or reversed, it will be because a substantial number of these private forest landowners found it profitable to manage their land. Expanded markets and higher prices for timber products, as well as financial incentives to landowners for tree planting and timber stand improvement, are among the stratagems for making timber growing more profitable.

FOREST MANAGEMENT OPPORTUNITIES

The rising demand for forest products nationally and the higher prices paid for them, together with a diminishing commercial forest base and a growing difference of opinion by user groups as to how it should be managed, force the public to consider ways to increase the supply of timber in the country. The following section discusses one technique used for estimating treatment opportunities and the area of commercial forest by treatment options open to forest managers during the decade 1974 to 1984 that could lead to an increased supply of timber in Iowa. The treatment classes are necessarily broad and are based on physical or silvicultural, rather than economic criteria. Other sets of criteria for determining treatment opportunities could be used, resulting in different management options from those shown in this paper. Additional treatment classes could also be added to those shown here. Foresters from the Iowa Conservation Commission participated in defining management classes, assigning treatments, and identifying management problems particular to Iowa.

The process used to determine treatment opportunities in Iowa included the following steps:

1. Each forest type found in Iowa was divided into management classes. Stands with similar physical characteristics, representing a potential treatment opportunity, were grouped into management classes according to their forest type, site index range, stand-age range, and basal area per acre range.

2. A treatment opportunity was assigned to each management class. Treatments considered included timber stand improvement (thinning and cull tree removal), harvest, and stand conversion or regeneration. Treatments assumed wood production (sawtimber or pulpwood) as the management objective, although wildlife and recreation needs were also considered. The prescription for a bur oak stand, for example, with a site index more than 49 feet, a stand-age between 55 and 65 years, and a stocking of at least 100 square feet of basal area per acre would be timber stand improvement (table 4).

3. Iowa's commercial forest was stratified into the above management classes by computer and the area of each forest type was summed by kind of treatment.

Table 4.—*Criteria used to assign commercial forest land to timber stand improvement and harvest treatment opportunities, Iowa, 1974-1984*[1]

	Treatments[2]		
	Timber stand improvement		Harvest
Forest type and site index	Age	All live tree basal area	Rotation age
	(Years)	*(Square feet/acre)*	*(Years)*
Eastern redcedar-hardwoods			
All sites	25-30	100+	80
	45-50	100+	
White oak-red oak-hickory			
0-69	25-35	100+	80
	55-65	100+	
70+	20-30	100+	110
	50-90	100+	
White oak			
0-69	25-35	100+	80
	55-65	100+	
70+	20-30	100+	110
	50-90	100+	
Aspen			
All sites	40-45	100+	60
Cottonwood			
All sites	20-25	110+	40
Maple-basswood			
All sites	20-30	110+	90
	50-70	110+	
Bur oak			
0-49	—	—	60
50+	55-65	100+	150
Elm-ash-cottonwood			
All sites	35-45	110+	80

[1]Where available, published management guides provided criteria for defining treatment opportunities. Criteria were modified and developed to take into account forest conditions in Iowa in discussions with Iowa Conservation Commission Foresters.

[2]Two additional treatments were considered in the analysis of treatment opportunities—no treatment and stand conversion or regeneration. Stand conversion or regeneration was assigned to all nonstocked commercial forest land and to understocked stands if basal area of all live trees was less than or equal to 19 + .38 (stand age). Stands that did not qualify for timber stand improvement, harvest, or stand conversion or regeneration were placed in the no treatment category.

No Treatment Needed on 69 Percent of Commercial Area

Under the management criteria used in this analysis of Iowa's treatment opportunities, an estimated 1,001 thousand acres of commercial forest land require no treatment during the decade (table 5). Seventy-five percent of the Western Survey Unit's commercial forests fall into this catagory, 71 percent of the Southeastern Unit's, and 64 percent of the Northeastern Unit's.

These sites are made up of stands that will not reach rotation age during the decade. Many of the stands are understocked with growing-stock trees, but a combination of their forest type, stand age, and basal area per acre make them ineligible for timber stand improvement or regeneration. Other stands are composed of species that do not respond well to the management options considered or are not commercially valuable species. Stocking is adequate in a

small portion of the stands, therefore neither thinning nor regeneration are required. However, these sites may benefit from more intensive forms of management such as pruning or fertilizing.

Stand Conversion or Regeneration Appropriate Treatment on 15 Percent of Commercial Area

Commercial forest land totaling 212 thousand acres would benefit from stand conversion or regeneration during the decade. Stands assigned this treatment fall into two general categories: (1) nonstocked commercial forest land (42 thousand acres), and (2) stands where basal area is so low in relation to stand-age that commercial timber will not be produced by rotation age (170 thousand acres). In either case, the treatment would likely result in improved utilization of the site. The bulk of the area in this treatment class is in the elm-ash-cottonwood and white oak-red oak-hickory forest types.

In general, young stands of commercially valuable forest types were selected for regeneration if the stands were growing on good sites and were selected for stand conversion if they were growing on poor sites. Forest types containing less valuable species (bur oak, for example) were selected for stand conversion even if stands were young and growing on good sites.

Only 17 percent (100 thousand acres) of the Northeastern Unit's commercial forest was selected for this treatment class. Fourteen percent (30 thousand acres) of the Western Unit's commercial area and 12 percent (82 thousand acres) of the Southwestern Unit's area were selected.

The areas of idle cropland (14 thousand acres) and wooded pasture (189 thousand acres) in need of regeneration are the total areas of idle cropland and wooded pasture in the State (table 5). Only a small amount, perhaps none, of this area will actually be regenerated to trees by the end of the decade. The entire area is included here, however, because conversion of this land to forest is an option available to land managers and represents the only real way to slow or reverse the trend of commercial forest loss.

Table 5.—*Area of nonforest land and of commercial forest land by forest type and class of treatment needed for the decade 1974 to 1984, Iowa*
(In thousand acres)

Land class and forest type	Total	Class of treatment needed			
		No treatment	Timber[1] stand improvement	Harvest	Stand[2] conversion or regeneration
NONFOREST LAND:					
Idle cropland	13.8	—	—	—	13.8
Wooded pasture	189.3	—	—	—	189.3
Subtotal	203.1	—	—	—	203.1
COMMERCIAL FOREST LAND:[3]					
Eastern redcedar-hardwood	34.9	27.1	—	—	7.8
White oak-red oak-hickory	514.8	372.5	6.7	60.7	74.9
White oak	150.1	78.8	4.5	60.6	11.2
Bur oak	157.4	107.3	—	31.1	19.0
Elm-ash-cottonwood	437.8	305.5	16.7	40.6	75.0
Cottonwood	12.3	8.2	—	4.1	—
Hard maple-basswood	143.6	101.6	8.2	9.6	24.2
Aspen	7.8	5.2	—	2.6	—
Subtotal	1,458.7	1,001.2	36.1	209.3	212.1
TOTAL	1,661.8	1,001.2	36.1	209.3	415.2

[1]Timber stand improvement includes thinning and cull tree removal on commercial forest land.

[2]Stand conversion or regeneration can occur on nonforest land or on commercial forest land if stocking in relation to age of the stand is so low that the stand is not expected to reach an adequate stocking level for commercial timber production by rotation age.

[3]Nonstocked area is distributed into the bur oak and elm-ash-cottonwood forest types.

Harvest of Mature Stands Called for on 14 Percent of Commercial Area

Timber harvest is the treatment assigned the 209 thousand acres of commercial forest that will reach rotation age or older by the end of the decade. Some form of partial cutting is anticipated to maintain an uneven-aged mix of stands in most forest types found in Iowa. On most areas that have been harvested for hardwoods, post-harvest treatment is necessary to remove undesirable or poor quality trees left because of poor markets for such trees.

Forty percent of the area of white oak type (61 thousand acres) will reach or exceed harvest age before 1984. The white oak-red oak-hickory and elm-ash-cottonwood types contribute 61 and 41 thousand acres, respectively, to this treatment class. In terms of proportion of total area of the type ready for harvest, aspen and cottonwood are significant, each with 33 percent. Most (89 percent) of the harvest area occurs in the Southeastern and Northeastern Units.

Stand-age and site index class were the principal criteria used in selecting stands for harvest. These silvicultural considerations are important to on-the-ground land managers but are used together with information on the availability and accessibility of stands to choose an active candidate for harvest. Therefore, the harvest areas above are overstated to the extent that owner preference and inaccessibility preclude their harvest.

Overstocking of Young Trees a Deterrent to Growth on 2 percent of Area

Stands selected for thinning occur on high quality sites that are overstocked with young trees. Such stands are found on 36 thousand acres of commercial forest in the State. Forty-six percent of this area is in the elm-ash-cottonwood type. Thinning in this type encourages establishment of naturally-occurring black walnut and also promotes growth and improves species composition within the type.

Thinning and cull tree removal was the treatment assigned to significant areas of the hard maple-basswood, white oak-red oak-hickory, and white oak types. None of the eastern redcedar-hardwood, bur oak, cottonwood, or aspen stands were found to fit the criteria for this treatment.

FOREST RESOURCES OTHER THAN TIMBER

Timber is a forest resource that is relatively easy to measure and whose impact in the marketplace can readily be assessed. The quantity and values of other forest resources, are often difficult to estimate. Forest recreation, for example, is often produced jointly with other forest products (perhaps timber and water), which makes it difficult to separate costs and returns specific to recreation. And the forest wildlife resource is mobile and can move in and out of the sampling area which makes an accurate census difficult to obtain.

Despite these difficulties, the Forest and Rangeland Renewable Resources Planning Act of 1974 (P.L. 93-378) directs the Department of Agriculture to conduct inventories of all outputs from the Nation's forests and rangeland, to analyze present and anticipated supplies and demand, and to suggest opportunities for improving yields. Although the data to perform such an intensive analysis of nontimber forest resources in Iowa are lacking at this time, a general discussion of the characteristics of three such forest resources—recreation, wildlife, and water—will be presented.

Iowa's citizens enjoy a wide range of outdoor recreational activities at a large number of diverse facilities. Forests play a direct or indirect role in many of these activities or facilities. Forests may serve to heighten the enjoyment of the recreational experience by influencing water quality, providing wildlife habitat, and enhancing the esthetic value of a site. Forests also add variety to Iowa's essentially level landscape, and, by reason of their relative scarcity, contribute significantly to Iowans' quality of life.

Driving, Picnicking, Hiking Done by More Than Half the Population[13]

The Iowa Conservation Commission conducted a survey in 1970 to determine the most popular forms of outdoor recreation in the State. Driving for pleasure

[13] *Statistics on outdoor recreation activity participation from Outdoor Recreation in Iowa: A Brief Synopsis published by the Iowa Conservation Commission. Licenses statistics are from Quickie Facts and Figures published by the Information and Education Section of the Iowa Conservation Commission.*

ranked first, as shown in the following tabulation, but forest-related activities were well represented:

Activity	Iowan population participating in the activity (Percent)
Driving for pleasure	78
Picnicking	67
Hiking	51
Fishing	36
Boating	21
Camping	16
Hunting	16

Several of these activities provide revenue for the State. Resident fishing licenses generated more than $1.9 million in revenue in 1974. Sale of resident hunting licenses produced $2.0 million in the same year. An additional $1.0 million was obtained through the sale of nonresident hunting licenses. Sale of boat registrations and camping permits also produce income for the State.

State of Iowa Provides Bulk of Recreation Facilities[14]

The Iowa Conservation Commission administers a diverse assortment of areas for recreational use. Many of these areas, which occupy more than 40.4 thousand acres, are on forested sites. The 71 State parks of Iowa are people-oriented developments with facilities for a variety of activities, including camping and picnicking (fig. 22). Some parks have additional natural areas for hiking and observing nature. Total attendance at Iowa State parks in 1974 was more than 12.1 million people, 432.8 thousand of whom were campers.

The Conservation Commission in Iowa administers 260 game management areas and 37 waterfowl refuges, totaling 310.5 thousand acres. Many of these areas are prairie wetlands, but some include forested wildlife habitat. Although these areas are generally considered the province of hunters, the results of a 1974 visitor survey revealed that 59 percent of the more than 1 million annual visitors are nonhunters.

The six State forest areas of Iowa occupy approximately 23.5 thousand acres. In addition to providing timber resources, State forests offer recreational opportunities including skiing, hiking, hunting, and primitive camping (fig. 23).

The Conservation Commission also operates State preserves—areas offering unique historic or natural qualities. Presently there are 27 State preserves in Iowa, many providing unique forest experiences. Some examples are Pecan Grove, the northernmost naturally-reproducing pecan stand of its size in existence, and White Pine Hollow, the largest stand of native white pine in the State.

Other agencies or landowners also provide recreational facilities in Iowa:

1. The federal government administers recreational areas and facilities of national historic and/or natural significance. In Iowa, the National Park Service administers the Herbert Hoover Historic Site and the Effigy Mounds National Monument; the USDI Fish and Wildlife Service manages four wildlife refuges; and the U.S. Army Corps of Engineers administers three water impoundments.

2. Most of Iowa's counties have organized county conservation boards. Working under the guidance of the State Conservation Commission, one of the functions of these boards is to develop outdoor recreational opportunities that complement State-administered areas. A total of 764 areas on approximately 50 thousand acres are administered by county boards and include parks, preserves, playgrounds, and forests.

3. Private recreation developments provide outdoor opportunities that public agencies cannot. They may function in conjunction with public facilities (as when concessions are operated by private businesses at a public facility) or fill a gap between the supply of certain public opportunities and demand by the public for that recreational opportunity.

Many Wildlife Species Dependent on Forest[15]

The forests of Iowa provide critical habitat for many wildlife species. Bobcat, ermine, hawk, squir-

[14] *Statistics on State parks, game management areas, waterfowl refuges, and State forests are from Quickie Facts and Figures. Information concerning State preserves and recreational facilities administered by agencies other than the Iowa Conservation Commission came from Outdoor Recreation in Iowa: A Brief Synopsis. Both sources are published by the Iowa Conservation Commission.*

[15] *Habitat and population information of squirrels and wild turkeys from Wildlife Investigations in Iowa Forests 1960-1974, by Bob Sheets, Wildlife Section, Iowa Conservation Commission. License and bag statistics from Iowa Conservation Commission's Quickie Facts and Figures.*

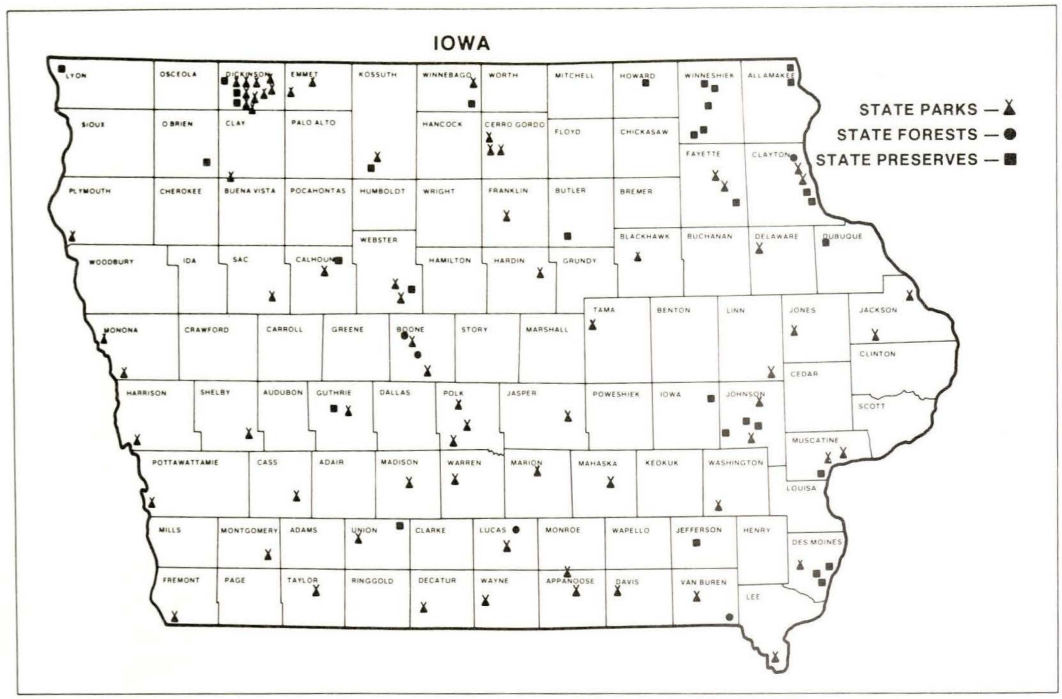

Figure 22.—*Recreational areas administered by the State of Iowa. Map adapted from information provided by the Iowa Conservation Commission.*

Figure 23.—*State Forests, like the Yellow River State Forest pictured here, offer outdoor recreational opportunities as well as being models of timber management practices.*

rel, ruffed grouse, woodcock, white-tailed deer, and many nongame wildlife species found in the State require forest cover to survive. A look at the habitat requirements for squirrels and wild turkeys demonstrates how forest land affects wildlife populations:

The grey and fox squirrels (*Sciurus niger* and *Sciurus carolinensis*) together are Iowa's third most important game species in terms of number of animals harvested. Approximately 40 percent of the State's licensed hunters hunt squirrels. The fox squirrel thrives in a habitat consisting of timber interspersed with agriculture, but the grey squirrel requires unbroken tracts of large timber (fig. 24). Iowa Conservation Commission studies revealed that the difference in squirrel harvests of both species in a county is due, in part, to the quantity of timber in that county. Other studies indicate that the fall squirrel harvest is directly related to mast production during the previous year, suggesting that mast surveys may be used to predict squirrel harvest.

The wild turkey (*Meleogris gallopavo*) in the north-central States requires a habitat of mature forests that are capable of supplying a dependable source of mast foods and safe roosting places. These habitat

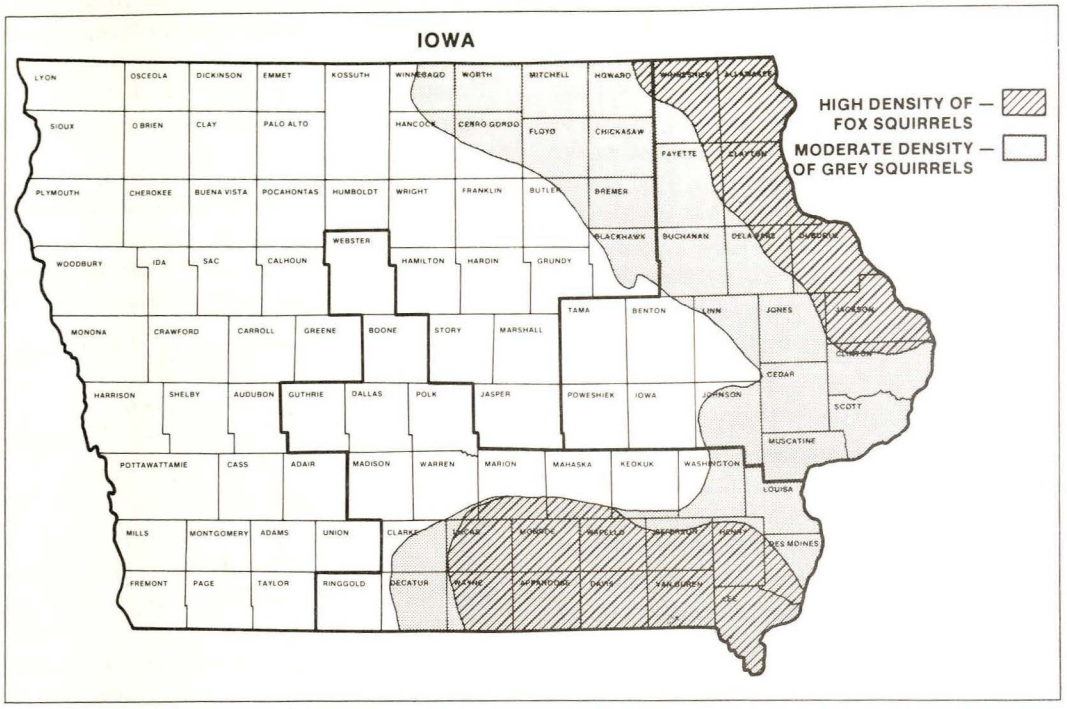

Figure 24.—*Fox and grey squirrel distribution, Iowa, 1960-1974. Map adapted from information provided by the Iowa Conservation Commission.*

conditions became scarce in the late 19th century when many forests were harvested for timber products and/or cleared for farming and development. As suitable habitat diminished, so did the wild turkey. During the 1900's, harvested forest land regenerated and some of the timber matured. Also during this period, some land previously cleared for crops was abandoned and reverted to forest land. In 1960, forest conditions suitable for turkey habitat in Iowa had improved and the State Conservation Commission began a program to reintroduce turkeys from Texas and Missouri into eastern and south-central Iowa. The wild turkey population in Iowa grew rapidly, and by 1971 it was possible to transplant birds into suitable habitat in southern and western Iowa. In 1974 a spring gobbler hunting season was established in areas known to support adequate populations of birds. Four hundred and fifty hunting permits were issued the first year and 113 birds were harvested, a 28 percent hunter success. The Conservation Commission is currently studying the potential for further distribution of wild turkeys in Iowa.

In 1974, Iowans purchased 328,769 resident fishing licenses, 175,933 resident hunting licenses, and 147,435 combination licenses.

The number one game species in Iowa in 1974 was the pheasant, both in terms of number of hunters (307,200) and in number of birds taken (1.7 million). The next most sought-after game species were rabbits (192,100 hunters took 1.3 million) and squirrels (159,000 hunters took 1.1 million). Other game harvested in substantial numbers were quail, ducks, geese, Hungarian partridges, raccoons, foxes, and coyotes.

Electric Power Generation Largest Water User in State[16]

There are more than 1,500 miles of interior streams, 33,000 acres of natural lakes, 15,000 acres of artificial lakes, and 25,650 acres of reservoirs in Iowa. The average annual precipitation for the State is 32 inches—approximately 10 percent falls in the form of snow.

Although the linkage between Iowa's forests and water resources may not be readily apparent, forests do exert a major influence on the three basic attributes of water—quantity, quality, and timing. Only 4

[16]*Information on surface waters found in the Iowa Conservation Commission's Quickie Facts and Figures. Data on water use and water quality from Projections of Population, Employment, Income and Water Use for Iowa River Basins 1975-2020 by Jerald R. Bernard and Warren T. Dent, Institute for Economic Research, University of Iowa.*

percent of Iowa's total land area is forested, however, many of the State's riverbanks and flood plains have forest cover. More than 20 percent of Iowa's commercial forest land is within ⅛ of a mile of water. Through interception of precipitation and evaporation, forests affect the quantity and timing of water reaching streams, lakes, and reservoirs. The structure of soils developed under forests encourages infiltration of rainfall and snow melt, which also affects timing and quantity of water yield. By providing ground cover and soil stabilization, forests reduce erosion and sedimentation, thereby improving water quality.

In 1970, an estimated 2,156 million gallons of water (excluding that used for hydroelectric power) were withdrawn from ground and surface water supplies in Iowa each day, with a consumption of 238 million gallons per day. This compares with the estimate for 1960 of 2,100 million gallons withdrawn and 230 million gallons consumed. Consumption represents the net depletion of water either because it has evaporated or because it is in a form not returnable to a body of water to be used again. The difference between the volume of water withdrawn and the water consumed (1,918 million gallons per day in 1970) is the volume of water used and returned to a body of water so it may be used again. Shown below are the estimated daily uses of water in Iowa in 1970:[17]

Major uses	Withdrawn (from ground and surface water)	Consumed
	(Million gallons per day)	
Public supplies[18]	250	37
Rural use[19]	180	150
Irrigation	26	26
Self-supplied industrial use[20]	1,700	25
Subtotal	2,156	238
Hydroelectric power	35,000	([21])
GRAND TOTAL	37,156	238

The bulk of the rural consumption, highest of the major uses of water, was for livestock use. Although irrigation only accounted for 11 percent of the 1970 consumption, its share of the total is expected to increase substantially in the future, as it has in surrounding States.

In addition to these uses, an estimated 35 billion gallons of water per day were used to generate hydroelectric power. This easily makes the electric utility sector the largest water user in the State.

The Iowa Department of Environmental Quality began monitoring the water quality of many of Iowa's lakes and streams in 1970. Monitoring has revealed an improvement in the levels of ammonia nitrogen and oxygen depletion, water quality factors that are used as indicators of the degree of pollution from point sources.[22] Iowa has an estimated 600 point sources of pollution, and the Department of Environmental Quality estimates that all or most meet the 1977 water quality standards for best practicable treatment. Water turbidity and nitrate levels in water supplies are two indicators of the degree of pollution from nonpoint sources, such as runoff from domestic animal feedlots or of chemical fertilizer from farmers fields. In Iowa, these factors suggest that more needs to be done to control this kind of pollution.

[17] *Source: U.S. Geological Survey, "Estimated Use of Water in the United States, 1970," Circular 676, Washington, D.C., 1972.*

[18] *Includes industrial, commercial, and domestic uses.*

[19] *Includes domestic and livestock uses.*

[20] *Includes electric utility and other uses.*

[21] *Not shown.*

[22] *A point source of pollution is any activity where the discharge of the polluting substance can be measured, regulated, and treated. A nonpoint source of pollution is any polluting activity not classified as a point source.*

APPENDIX

ACCURACY OF SURVEY

Forest Survey information is based on a sampling procedure designed to provide reliable statistics at the State and Survey Unit levels. Consequently, the reported figures are estimates only. However, a measure of reliability of these figures is given by sampling errors. These sampling errors may be interpreted as meaning that the chances are two out of three that the results for the sample differ, by no more than the amount indicated, from the results that would have been obtained if all trees in the State had been measured (a 100-percent inventory), using the same tree measurements.

For example, the estimated area of commercial forest land in the State in 1974, 1,458.7 thousand acres, has a sampling error of 2.25 percent (± 32.8 thousand acres). Therefore, the chances are two out of three that the commercial forest area falls between 1,425.9 and 1,491.5 thousand acres, the limits within which the results of a 100-percent inventory would occur.

Item	State totals		Sampling error[23] (Percent)
Growing stock:			
Volume	1,054.7	Million cu. ft.	3.96
Growth	41.3	Million cu. ft.	5.35
Removals	50.3	Million cu. ft.	19.93
Sawtimber:			
Volume	3,486.5	Million board ft.	4.67
Growth	79.8	Million board ft.	6.21
Removals	163.3	Million board ft.	18.43
Commercial forest land:	1,458.7	Thousand acres	2.25

As survey data are broken down into units smaller than State or Survey Unit totals, the sampling error increases (table 6). The smaller the breakdown, the larger the sampling error.

[23] *At the 67-percent probability level.*

SURVEY PROCEDURE

The major steps in the Iowa survey were as follows:

1. A total of 398,046, 1-acre points distributed systematically across aerial photos of the entire State were observed. A photo interpreter classified these points as either forest land (19,111), questionable (1,662), or nonforest land (377,273) in order to make a preliminary estimate of forest area. Next, 9,541 o the forest points and 831 of the questionable points were stereoclassifed as to forest type, stand-size class, and density. Then, 636 points classed as forest, 55 points classed as questionable, and 11,940 points classed as nonforest were examined on the ground. This procedure provides a means for adjusting the initial estimates of area for change in land use since date of photography and for photo misclassifications.

Estimates of timber volume, growth, mortality, and forest classifications were based on tree measurements recorded at 531 ground sample locations distributed within the commercial forest land base. A 10-point cluster of plots (37.5 basal area factor) were systematically spaced on an acre at each of these sample locations.

2. Ownership information was collected by contacting local landowners and from public records.

3. Industrial roundwood data for 1972 came from a complete canvass of primary wood-using firms using Iowa logs and bolts. All canvassing in Iowa (except pulpmills) was done by the Iowa Conservation Commission through personal contacts with the firms. The North Central Forest Experiment Station sent questionnaires to Iowa pulpmills and out-of-State mills using Iowa roundwood.

The Station also obtained by mail questionnaire the 1972 timber product output data for public forest land and forest land owned by primary wood-using firms. The portion of timber products output unaccounted for by public and private industrial owners was grouped under "farm and other owners".

Fuelwood, post, and farm timber production in 1972 from private land (other than industrial) was determined by a canvass of a sample of Iowa households. Households in the sample were contacted by Iowa Conservation Commission personnel.

Table 6.—*Sampling errors*[1] *for estimates smaller than State totals of volume, net growth, and removals, and of area of commercial forest land in Iowa, 1974*

Sampling error (percent)	Commercial forest area	Growing stock			Sawtimber		
		Volume	Growth	Removals	Volume	Growth	Removals
	Acres	*—Million cubic feet—*			*—[2]Million board feet—*		
1	7,376,700	16,532.4	1,378.3	22,720.1	76,108.2	4,076.4	61,985.4
2	1,844,200	4,133.1	344.6	5,680.0	19,027.0	1,019.1	15,496.4
3	819,600	1,836.9	153.1	2,524.5	8,456.5	452.9	6,887.3
4	461,000	1,033.3	86.1	1,420.0	4,756.8	254.8	3,874.1
5	295,100	661.3	55.1	908.8	3,044.3	163.1	2,479.4
10	73,800	165.3	13.8	227.2	761.1	40.8	619.9
15	32,800	73.5	6.1	101.0	338.3	18.1	275.5
20	18,400	41.3	3.4	56.8	190.3	10.2	155.0
25	11,800	26.5	2.2	36.4	121.8	6.5	99.2
50	2,900	6.6	0.5	9.1	30.4	1.6	24.8
100	700	1.7	0.1	2.3	7.6	0.4	6.2

[1]*At the 67-percent probability level. Figures in the table show areas or volumes that have the sampling error shown in the column at the extreme left. For example, a commercial forest area of 7,376.7 thousand acres has a sampling error of ± 1 percent, and an area of 295.1 thousand acres has an error of ± 5 percent. Sampling errors for areas or volumes between those listed can be approximated by interpolation.*

[2]*International ¼-inch rule.*

4. Wood utilization factors developed during the 1971-1972 utilization study in Missouri were used to convert timber products output to timber removals for saw logs, veneer logs, cooperage logs, and pulpwood. Factors for all other products were obtained during the 1959-1960 Missouri utilization study.

5. All field data were sent to St. Paul where they were edited, punched on cards, and stored on magnetic tape for later electronic computer sorting, computing, and tabulating.

LOG GRADE

Log grade data developed during the 1972 Missouri Forest Inventory were used to distribute Iowa's timber volume into log-grade classes.

METRIC EQUIVALENTS OF UNITS USED IN THIS REPORT

1 acre = 4,046.86 square meters or 0.405 hectare.
1,000 acres = 405 hectares
1,000 board feet (International ¼-inch rule) = 3.48 cubic meters.
Breast height = 1.4 meters above the ground.
1 cord (solid wood, pulpwood) = 2.237 cubic meters.
1 cubic foot = 28,317 cubic centimeters or 0.028317 cubic meter.
1,000 cubic feet = 28.317 cubic meters.
1 foot = 30.48 centimeters or 0.3048 meters.
1 inch = 25.4 millimeters or 2.54 centimeters or 0.0254 meter.

DEFINITION OF TERMS

Land-Use Classes

Gross area.—The entire area of land and water as determined by the Bureau of Census, 1970.

Land area.—The area of dry land and land temporarily or partially covered by water such as marshes, swamps, flood plains, streams, sloughs, and estuaries. Canals less than ⅛-mile wide and lakes, reservoirs, and ponds smaller than 40 acres are included as land area. These figures are from the Bureau of Census, 1970.

Forest land.—Land at least 16.7 percent stocked by forest trees of any size, or normally having such tree cover, and not currently developed for nonforest use. Includes afforested areas. The minimum forest area classified was 1 acre. Roadside, streamside, and shelterbelt strips of timber must have a crown width of at least 120 feet to qualify as forest land. Unimproved roads and trails, streams, and clearings in forest areas were classed as forest if less than 120 feet wide.

Commercial forest land.—Forest land that is producing or is capable of producing crops of industrial wood and that is not withdrawn from timber utilization by statute or administrative regulation. This includes areas suitable for management to grow crops of industrial wood generally of a site quality capable of producing in excess of 20 cubic feet per acre of annual growth. This includes both inaccessible and inoperable areas.

Noncommercial forest land.—(a) Unproductive—forest land incapable of yielding crops of industrial wood because of adverse site conditions. (b) Productive-reserved—forest land withdrawn from commercial timber use through statute or administrative regulation, or exclusively used for Christmas tree production.

Nonforest land.—Land that has never supported forests, and land formerly forested where forest use is precluded by development for nonforest uses. Unimproved roads, streams, canals, and nonforest strips in forest areas must be more than 120 feet wide, and clearings in forest areas must be more than 1 acre in size, to qualify as nonforest land. Nonforest land classes include:

A. Nonforest with trees:

(1.) Improved pasture with trees—land developed for grazing domestic livestock and less than 16.7 percent stocked (basal area stocking) with live trees. Grazing developments include fencing, seeding to grass, clearing trees or brush, and constructing livestock water facilities.

(2.) Wooded pasture—improved pasture at least 16.7 stocked with live trees but less than 25 percent stocked with growing-stock trees. Wooded pasture is land stocked sufficiently with trees to be classed as forest land but on which the present highest use is forage production for livestock. The latter is determined by the presence of livestock and the performance of grazing improvements. If the present highest use of such land changes, as evidenced by the removal of livestock, the land would be classed as forest land.

(3.) Wooded strips—continuous forest land at least 1 acre in area that meets the Resources Evaluation standards for commercial forest land except for being less than 120 feet wide.

(4.) Idle farmland with trees—farmland not tended within the last 2 years and less than 16.7 percent stocked with live trees.

(5.) Windbreak—planted windbreak less than 120 feet wide, or smaller than 1 acre in area, or both.

B. Nonforest without trees:

(1.) Urban and other—areas within the legal boundaries of cities and towns; suburban areas developed for residential, industrial, and recreational purposes; schoolyards; cemeteries; roads; railroads; airports; and powerlines and other rights-of-way.

Ownership classes

Federal.—Land owned by the federal government. Iowa has no National Forest, Indian, or Bureau of Land Management land.

State, county, and municipal.—Land owned by States, counties, or local public agencies, or land leased by them for more than 50 years.

Forest industry.—Land owned by companies or individuals operating primary wood-using plants.

Farmer.—Land owned by operators of farms. A farm must include 10 or more acres from which the

sale of agricultural products totals $50 or more annually, or if less than 10 acres, the yield must be at least $250 annually.

Miscellaneous private.—Privately owned land other than forest industry or farmer-owned.

Tree Classes

All live trees.—Growing-stock, rough, and rotten trees 1 inch d.b.h. and larger.

Growing-stock trees.—All live trees of commercial species qualifying as desirable or acceptable trees. Excludes rough, rotten, and dead trees.

Desirable trees.—Growing-stock trees having no serious defects in quality limiting present or prospective use, and of relatively high vigor and containing no pathogens that may result in death or serious deterioration before rotation age. These trees would be favored by forest managers in silvicultural operations.

Acceptable trees.—Trees meeting the standards for growing stock but not qualifying as desirable trees.

Sawtimber trees.—Growing-stock trees of commercial species containing at least a 12-foot saw log or two noncontiguous saw logs, each 8 feet or longer. At least 33 percent of the gross volume of the tree must be sound wood. Softwoods must be at least 9.0 inches d.b.h. and hardwoods at least 11.0 inches d.b.h.

Poletimber trees.—Growing-stock trees of commercial species at least 5.0 inches d.b.h. but smaller than sawtimber size and of good form and vigor.

Saplings.—Live trees of commercial species 1.0 to 5.0 inches d.b.h. and of good form and vigor.

Seedlings.—Live trees of commercial species less than 1.0 inch d.b.h. that are expected to survive according to regional standards. (Examples of seedlings not expected to survive are those that are diseased or heavily damaged by logging, browsing, or fire.) Only softwood seedlings more than 6 inches tall and hardwood seedlings more than 1 foot tall are counted.

Rotten trees.—Live trees (any size) of commercial species that do not contain a merchantable 12-foot saw log or two noncontiguous 8-foot or longer saw logs, now or prospectively, because of rot (that is, when more than 50 percent of the cull volume of the tree is rotten).

Rough trees.—Live trees that do not contain at least one merchantable 12-foot saw log or two noncontiguous 8-foot or longer saw logs, now or prospectively, because of roughness and poor form, as well as all live noncommercial species.

Short-log (rough trees).—Sawtimber-sized trees of commercial species that contain at least one merchantable 8- to 11-foot saw log but not a 12-foot saw log.

Stocking

The degree of utilization of land by trees as measured in terms of basal area and/or the number of trees in a stand compared to the basal area and/or the number of trees required to fully utilize the growth potential of the land.

A stocking percent of 100 indicates full utilization of the site and is equivalent to 80 square feet of basal area per acre in trees 5 inches d.b.h. and larger. In a stand of trees less than 5 inches d.b.h., a stocking percent of 100 percent would indicate that the present number of trees is sufficient to produce 80 square feet of basal area per acre when the trees do reach 5 inches d.b.h.

Stocking of all live trees, growing-stock trees, and desirable trees are recorded separately and stands are grouped into the following stocking classes.

Stocking Classes

Overstocked stands.—Stands in which stocking of trees is 133 percent or more.

Fully stocked stands.—Stands in which stocking of trees is from 100 to 133 percent.

Medium stocked stands.—Stands in which stocking of trees is from 60 to 100 percent.

Poorly stocked stands.—Stands in which stocking of trees is from 16.7 to 60 percent.

Nonstocked areas.—Commercial forest land on which stocking of growing-stock trees is less than 16.7 percent.

Area-condition Classes

Class 10.—Areas fully stocked with desirable trees but not overstocked.

Class 20.—Areas fully stocked with desirable trees but overstocked with all live trees.

Class 30.—Areas medium to fully stocked with desirable trees and with less than 30 percent of the area controlled by other trees and/or inhibiting vegetation or surface conditions that will prevent occupancy by desirable trees.

Class 40.—Areas medium to fully stocked with desirable trees and with 30 percent or more of the area controlled by other trees and/or conditions that ordinarily prevent occupancy by desirable trees.

Class 50.—Areas poorly stocked with desirable trees but fully stocked with growing-stock trees.

Class 60.—Areas poorly stocked with desirable trees but with medium to full stocking of growing-stock trees.

Class 70.—Areas poorly stocked with desirable trees and poorly stocked with growing-stock trees.

Stand-size Classes

Stand.—A growth of trees on a minimum of 1 acre of forest land that is stocked by forest trees of any size.

Sawtimber stands.—Stands at least 16.7 percent stocked with growing-stock trees, with half or more of this stocking in sawtimber or poletimber trees and with sawtimber stocking at least equal to poletimber stocking.

Poletimber stands.—Stands at least 16.7 percent stocked with growing-stock trees and with half or more of this stocking in sawtimber and/or poletimber trees and with poletimber stocking exceeding that of sawtimber.

Sapling-seedling stands.—Stands at least 16.7 percent stocked with growing-stock trees and with saplings and/or seedlings comprising more than half of this stocking.

Nonstocked areas.—Commercial forest land on which stocking of growing-stock trees is less than 16.7 percent.

Other Classifications

Site index.—An expression of forest site quality based on the height of a free-growing dominant or codominant tree of a representative species in the forest type at age 50.

Site classes.—A classification of forest land in terms of inherent capacity to grow crops of industrial wood expressed in cubic-foot growth per acre per year.

Stand-age.—Age of the main stand. Main stand refers to trees of the dominant forest type and stand-size class.

Basal area.—The area in square feet of the cross section at breast height of a single tree. When the basal area of all live trees in a stand are summed, the result is usually expressed as square feet of basal area per acre.

Forest Types

A classification of forest land based upon the species forming a plurality of live-tree stocking. Land less than 16.7 percent stocked is classed as nonstocked. Major forest types in Iowa are:

Eastern redcedar-hardwood.—Forests in which hardwoods (usually upland oaks) comprise a plurality of all stocking but in which eastern redcedar comprises 25 to 50 percent of the stocking.

White oak-red oak-hickory.—Forests in which white oak, northern red oak, black oak, northern pin oak, bur oak, shagbark or bitternut hickory, singly or in combination, comprise a plurality of the stocking. Common associates include white or green ash, sugar maple, and occasionally black cherry, butternut, bigtooth aspen, and black walnut. The type is often referred to by the generic term "oak-hickory".

White oak.—Forests in which white oak comprises more than 50 percent of the stocking of the primary typing species for the oak-hickory type. Associated species are black oak, northern red oak, bur oak, shagbark and bitternut hickories, white ash, and bigtooth aspen.

Bur oak.—Forests in which bur oak comprises more than 50 percent of the stocking of the primary typing species for the oak-hickory type. Associated species include northern pin oak, northern red oak, white oak, black oak, basswood, American elm, green ash, boxelder, hackberry, cottonwood, and hophornbeam.

Elm-ash-cottonwood.—Forests in which elm, ash, or cottonwood, singly or in combination, comprise a plurality of the stocking. Associates include black willow, sycamore, boxelder, silver maple, river birch, and other moist site hardwood species.

Cottonwood.—Forests in which cottonwood comprises a plurality of the stocking of the major typing species of the elm-ash-cottonwood type.

Hard maple-basswood.—Forests in which sugar maple or basswood, singly or in combination, com-

prise a plurality of the stocking. Associated species include American elm, green ash, yellow birch, white pine, and northern red oak.

Aspen.—Forests in which quaking aspen or bigtooth aspen, singly or in combination, comprise a plurality of the stocking. Associates include bur oak, green ash, American elm, paper birch, and boxelder.

Timber Volume

Volume of growing stock.—The volume of sound wood in the bole of growing-stock trees 5.0 inches d.b.h. and over, from a 1-foot stump to a minimum of 4.0-inch top diameter outside bark, or to the point where the central stem breaks into limbs. Growing-stock volumes are shown in cubic feet.

Volume of sawtimber.—Net volume of the saw log portion of live sawtimber trees in board feet, International ¼-inch rule, from stump to a minimum 7 inches top diameter outside bark for softwoods and 9 inches for hardwoods.

Upper stem portion.—That part of the bole of sawtimber trees above the merchantable sawtimber top to a minimum top diameter of 4.0 inches outside bark or to the point where the central stem breaks into limbs.

Growth and Mortality

Net annual growth of growing stock.—The annual change in volume of sound wood in live growing-stock and sawtimber trees and the total volume of trees entering these classes through ingrowth, less volume losses resulting from natural causes.

Net annual growth of sawtimber.—The annual change in volume of live sawtimber trees and the total volume of trees reaching sawtimber size, less volume losses resulting from natural causes.

Mortality of growing stock.—The volume of sound wood in growing-stock trees dying annually from natural causes. Natural causes include fire, insects, disease, animal damage, weather, and suppression.

Mortality of sawtimber.—The net board-foot volume of sawtimber trees dying annually from natural causes.

Timber Removals

Timber removals from growing stock.—The volume of sound wood in growing-stock trees removed annually for forest products (including roundwood and logging residues) and for other removals. Roundwood products are logs, bolts, or other round sections cut and used from trees. Logging residues are the unused portions of cut trees plus unused trees killed by logging. Other removals are growing-stock trees removed but not utilized for products or trees left standing but "removed" from the commercial forest land classification by land use change—examples are removals from cultural operations such as timber stand improvement work, land clearing, and changes in land use.

Timber removals from sawtimber.—The net board-foot volume of live sawtimber trees removed for forest products annually (including roundwood products and logging residues) and for other removals.

Timber products output.—All timber products cut from roundwood, and byproducts of wood manufacturing plants. Roundwood products include logs, bolts, or other round sections cut from growing-stock trees, cull trees, salvable dead trees, trees on nonforest land, noncommercial species, sapling-size trees, and limbwood. Byproducts from primary manufacturing plants include slabs, edgings, trimmings, miscuts, sawdust, shavings, veneer cores and clippings, and screenings of pulpmills that are used as pulp chips or other products.

Plant byproducts.—Wood products, such as pulpwood chips, obtained incidental to production of other manufactured products. Byproducts are broken into:

Coarse plant byproducts.—Wood suitable for chipping, such as slabs, edgings, and veneer cores.

Fine plant byproducts.—Wood not suitable for chipping, such as sawdust and veneer clippings.

Plant residues.—Wood materials from manufacturing plants not utilized for products.

PRINCIPAL TREE SPECIES IN IOWA[24]

SOFTWOOD SPECIES:

- Balsam fir ..... *Abies balsamea*
- Eastern redcedar ..... *Juniperus virginiana*
- Eastern white pine ..... *Pinus strobus*

HARDWOOD SPECIES:

Select white oaks:
- White oak ..... *Quercus alba*
- Swamp white oak ..... *Quercus bicolor*
- Bur oak ..... *Quercus macrocarpa*
- Chinkapin oak ..... *Quercus muehlenbergii*

Other white oaks:
- Overcup oak ..... *Quercus lyrata*
- Post oak ..... *Quercus stellata var. stellata*

Select red oaks:
- Northern red oak ..... *Quercus rubra*

Other red oaks:
- Northern pin oak ..... *Quercus ellipsoidalis*
- Shingle oak ..... *Quercus imbricaria*
- Pin oak ..... *Quercus palustris*
- Black oak ..... *Quercus velutina*

Hickory:
- Bitternut hickory ..... *Carya cordiformis*
- Shellbark hickory ..... *Carya laciniosa*
- Shagbark hickory ..... *Carya ovata*
- Mockernut hickory ..... *Carya tomentosa*

Hard maple:
- Black maple ..... *Acer nigrum*
- Sugar maple ..... *Acer saccharum*

Soft maple:
- Silver maple ..... *Acer saccharinum*

Ashes:
- White ash ..... *Fraxinus americana*
- Black ash ..... *Fraxinus nigra*
- Green ash ..... *Fraxinus pennsylvanica*

Eastern cottonwood ..... *Populus deltoides*

Aspens:
- Bigtooth aspen ..... *Populus grandidentata*
- Quaking aspen ..... *Populus tremuloides*

American basswood ..... *Tilia americana*

Elms:
- American elm ..... *Ulmus americana*
- Slippery elm ..... *Ulmus rubra*
- Rock elm ..... *Ulmus thomasii*

Black walnut ..... *Juglans nigra*

Black cherry ..... *Prunus serotina*

Hackberry ..... *Celtis occidentalis*

Black willow ..... *Salix nigra*

Birches:
- River birch ..... *Betula nigra*
- Paper birch ..... *Betula papyrifera*

Other hardwoods:
- Boxelder ..... *Acer negundo*
- Ohio buckeye ..... *Aesculus glabra*
- Honeylocust ..... *Gleditsia triacanthos*
- Kentucky coffeetree ... *Gymnocladus dioicus*
- Butternut ..... *Juglans cinerea*
- Osage-orange ..... *Maclura pomifera*
- Red mulberry ..... *Morus rubra*
- Sycamore ..... *Platanus occidentalis*
- Black locust ..... *Robinia pseudoacacia*

[24] *The common and scientific names are based on: Little, Elbert L., Jr. 1979. Checklist of United States Trees (Native and Naturalized). U.S. Department of Agriculture, Agriculture Handbook 541, 375 p.*

Table 7.--Area by land class and by Forest Survey Unit, Iowa, 1974

(In thousand acres)

Land class	All units	Northeastern	Southeastern	Western
FOREST LAND:				
Commercial	1,458.7	584.5	659.4	214.8
Productive reserved	75.9	23.1	43.4	9.4
Unproductive	26.7	6.9	5.5	14.3
Total	1,561.3	614.5	708.3	238.5
NONFOREST LAND:				
Nonforest with trees:				
Wooded pasture	189.3	101.8	68.1	19.4
Wooded strips	179.5	33.7	74.7	71.1
Improved pasture	314.4	86.6	161.8	66.0
Cropland	160.8	48.4	27.6	84.8
Idle farmland	13.8	--	13.8	--
Windbreaks	8.0	--	--	8.0
Subtotal	865.8	270.5	346.0	249.3
Nonforest without trees:				
Cropland[1/]	28,131.4	7,087.6	8,021.5	13,022.3
Other farmland	3,606.1	719.6	1,568.4	1,318.1
Marsh	70.3	29.6	8.4	32.3
Urban and other	1,632.7	464.5	657.0	511.2
Subtotal	33,440.5	8,301.3	10,255.3	14,883.9
Total	34,306.3	8,571.8	10,601.3	15,133.2
Total land area[2/]	35,867.6	9,186.3	1,309.6	15,371.7

[1/] 1969 Census of Agriculture

[2/] United States Bureau of the Census, Land and Water Area of the United States, 1970.

Table 8.--Area of land and forest land by counties, Iowa, 1974

Survey Unit and county	All land[1]	Forest land[2]			Percent commercial forest
		Total	Commercial[3]	Non-commercial[4]	
	-Thousand acres-				
NORTHEASTERN					
Allamakee	406.8	101.8	100.3	1.5	25
Benton	459.3	15.3	14.7	0.6	3
Black Hawk	363.5	12.9	9.8	3.1	3
Bremer	281.0	12.6	12.2	0.4	4
Buchanan	363.6	11.2	10.3	0.9	3
Butler	372.5	9.3	8.8	0.5	3
Cedar	374.4	15.6	15.2	0.4	4
Chicksaw	323.4	8.1	7.8	0.3	2
Clayton	498.8	84.4	82.1	2.3	16
Clinton	443.8	24.0	23.6	0.4	5
Delaware	365.8	19.4	17.1	2.3	5
Dubuque	391.8	38.2	36.7	1.5	9
Fayette	465.9	28.0	27.2	0.8	6
Floyd	321.9	7.7	7.3	0.4	2
Grundy	320.6	0.7	0.6	0.1	--
Howard	301.4	6.5	6.2	0.3	2
Jackson	412.0	57.6	56.3	1.3	14
Johnson	396.4	25.2	19.1	6.1	5
Jones	374.4	28.3	27.4	0.9	7
Linn	458.8	32.3	28.3	4.0	6
Mitchell	298.8	5.0	4.8	0.2	2
Scott	290.3	10.8	10.4	0.4	4
Tama	460.8	19.8	19.2	0.6	4
Winneshiek	440.3	39.8	39.	0.7	9
Total	9,186.3	614.5	584.5	30.0	6
SOUTHEASTERN					
Appanoose	334.7	30.5	25.2	5.3	8
Boone	366.7	22.4	18.0	4.4	5
Clarke	274.5	22.5	22.2	0.3	8
Dallas	382.0	19.2	17.4	1.8	5
Davis	325.9	26.8	25.9	0.9	8
Decatur	339.2	29.2	28.0	1.2	8
Des Moines	261.2	26.0	25.0	1.0	10
Guthrie	381.4	25.5	24.4	1.1	6
Hamilton	369.5	6.2	6.0	0.2	2
Hardin	367.2	9.5	8.9	0.6	2
Henry	281.6	23.0	21.9	1.1	8
Iowa	373.6	18.2	18.0	0.2	5
Jasper	470.0	12.0	11.3	0.7	2
Jefferson	279.0	17.8	17.6	0.2	6
Keokuk	370.5	16.0	15.8	0.2	4
Lee	337.5	50.7	50.0	0.7	15
Louisa	258.0	22.2	22.2	--	9
Lucas	277.6	31.7	29.4	2.3	11
Madison	361.0	26.0	25.4	0.6	7
Mahaska	366.0	15.5	15.1	0.4	4
Marion	362.9	26.7	17.4	9.3	5
Marshall	367.4	8.5	7.9	0.6	2
Monroe	278.4	34.4	34.1	0.3	12
Muscatine	283.2	19.2	18.7	0.5	7
Polk	380.0	17.3	10.1	7.2	3
Poweshiek	377.0	7.6	7.3	0.3	2
Story	363.5	5.5	5.2	0.3	1
Van Buren	311.6	38.2	36.0	2.2	12
Wapello	279.4	23.3	23.0	0.3	8
Warren	365.8	24.2	22.7	1.5	6
Washington	363.5	18.7	17.2	1.5	5
Wayne	340.3	15.9	14.8	1.1	4
Webster	459.5	17.9	17.3	0.6	4
Total	11,309.6	708.3	659.4	48.9	6

(Table 8 continued on next page)

(Table 8 continued)

WESTERN

Survey Unit and county	All land 1/	Forest land 2/			Percent commercial forest
		Total	Commercial 3/	Non-commercial 4/	
Adair	364.2	6.2	5.7	0.5	2
Adams	272.6	7.6	7.1	0.5	3
Audubon	286.7	1.3	1.1	0.2	--
Buena Vista	366.3	2.4	2.1	0.3	1
Calhoun	365.6	0.6	0.5	0.1	--
Carroll	367.3	1.0	0.5	0.5	--
Cass	357.8	2.7	2.5	0.2	1
Cerro Gordo	368.1	0.9	0.6	0.3	--
Cherokee	366.7	4.7	4.0	0.7	1
Clay	364.9	3.9	3.4	0.5	1
Crawford	458.2	4.6	4.2	0.4	1
Dickinson	242.9	0.6	0.4	0.2	--
Emmet	252.3	2.7	2.0	0.7	1
Franklin	375.0	3.3	2.7	0.6	1
Fremont	335.2	14.0	12.4	1.6	4
Greene	364.1	6.4	5.8	0.6	2
Hancock	364.9	0.9	0.5	0.4	--
Harrison	445.3	30.5	28.2	2.3	6
Humboldt	278.4	2.5	2.2	0.3	1
Ida	275.8	0.5	0.3	0.2	--
Kossuth	626.6	2.5	2.3	0.2	--
Lyon	376.3	1.7	1.6	0.1	--
Mills	285.8	12.7	11.9	0.8	4
Monona	447.5	25.1	22.5	2.6	5
Montgomery	270.1	4.7	4.2	0.5	2
O'Brien	367.9	1.3	1.1	0.2	--
Osceola	254.6	0.1	0.1	--	--
Page	342.4	7.3	6.9	0.4	2
Palo Alto	358.7	1.5	1.4	0.1	--
Plymouth	552.3	5.2	4.8	0.4	1
Pocahontas	371.6	0.8	0.8	--	--
Pottawattamie	616.4	13.9	12.9	1.0	2
Ringgold	344.1	15.2	14.1	1.1	4
Sac	370.0	1.7	1.4	0.3	--
Shelby	375.7	1.8	1.6	0.2	--
Sioux	490.3	1.0	0.7	0.3	--
Taylor	337.7	10.3	9.5	0.8	3
Union	272.0	15.4	14.5	0.9	5
Winnebago	256.7	0.3	0.2	0.1	--
Woodbury	557.6	14.5	12.6	1.9	2
Worth	256.1	1.6	1.1	0.5	--
Wright	369.0	2.6	2.4	0.2	1
Total	15,371.7	238.5	214.8	23.7	1
State total	35,867.6	1,561.3	1,458.7	102.6	4

1/ 1970 Bureau of the Census estimates.

2/ Land at least 16.7 percent stocked by forest trees of any size, or formerly having such tree cover: excludes lands currently developed for nonforest use such as urban or heavily settled residential or resort area, city parks, orchards, improved roads, or improved pasture lands. The minimum forest area classified was 1 acre. Roadside, streamside, and shelterbelt strips of timber with crown width of at least 120 feet and unimproved roads and trails, streams, and clearings in forested areas if less than 120 feet in width were classified as forest.

3/ Forest land producing or capable of producing crops of industrial wood and not withdrawn from timber utilization by statute or administrative regulation.

4/ Unproductive forest land incapable of yielding crops of industrial wood because of adverse site conditions and productive public forest land withdrawn from commercial timber production through a statute or administrative regulation.

Table 9.--Area of commercial forest land by ownership class, Iowa 1974

(In thousand acres)

Ownership class	Area
Federal	55.2
State	51.3
County and municipal	4.7
Forest industry	16.7
Farmer	987.0
Miscellaneous private	
Individual	304.9
Corporate	38.9
All owners	1,458.7

Table 10.--Area of commercial forest land by ownership class and Forest Survey Unit, Iowa, 1974

(In thousand acres)

Ownership class	All units	North-eastern	South-eastern	Western
Public	111.2	58.6	37.0	15.6
Forest industry	16.7	3.7	13.0	--
Farmer	987.0	384.7	443.6	158.7
Miscellaneous private	343.8	137.5	165.8	40.5
All owners	1,458.7	584.5	659.4	214.8

Table 11.--Area of commercial forest land by stand-size class, ownership class, and Forest Survey Unit, Iowa, 1974

(In thousand acres)

Unit and stand-size class	All owners	Ownership class			
		Public	Forest industry	Farmer	Misc. private
NORTHEASTERN					
Sawtimber	375.2	34.3	2.6	249.9	88.4
Poletimber	123.2	12.8	0.7	86.4	23.3
Sapling and seedling	61.0	11.5	--	33.7	15.8
Nonstocked	25.1	--	0.4	14.7	10.0
All classes	584.5	58.6	3.7	384.7	137.5
SOUTHEASTERN					
Sawtimber	316.8	31.8	6.0	192.9	86.1
Poletimber	179.4	5.2	3.7	126.1	44.4
Sapling and seedling	152.8	--	3.2	117.1	32.5
Nonstocked	10.4	--	0.1	7.5	2.8
All classes	659.4	37.0	13.0	443.6	165.8
WESTERN					
Sawtimber	89.4	3.2	--	61.8	24.4
Poletimber	54.0	3.1	--	36.5	14.4
Sapling and seedling	64.5	5.7	--	58.1	0.7
Nonstocked	6.9	3.6	--	2.3	1.0
All classes	214.8	15.6	--	158.7	40.5
ALL UNITS					
Sawtimber	781.4	69.3	8.6	504.6	198.9
Poletimber	356.6	21.1	4.4	249.0	82.1
Sapling and seedling	278.3	17.2	3.2	208.9	49.0
Nonstocked	42.4	3.6	0.5	24.5	13.8
All classes	1,458.7	111.2	16.7	987.0	343.8

Table 12.--Area of commercial forest land by area-condition class and ownership class, Iowa, 1974

(In thousand acres)

Area-condition class	All owners	Ownership class			
		Public	Forest industry	Farmer	Misc. private
20	2.1	--	--	2.1	--
30	--	--	--	--	--
40	2.0	0.3	--	--	1.7
50	99.6	23.7	0.9	47.8	27.2
60	501.7	37.0	6.5	338.2	120.0
70	853.3	50.2	9.3	598.9	194.9
All classes	1,458.7	111.2	16.7	987.0	343.8

Table 13.--Area of commercial forest land by site class and ownership class, Iowa, 1974

(In thousand acres)

Site class (cubic feet of growth/acre/year)	All owners	Ownership class			
		Public	Forest industry	Farmer	Misc. private
225+	3.4	--	--	3.4	--
165-224	--	--	--	--	--
120-164	37.3	17.7	0.2	10.2	9.2
85-119	115.1	21.1	1.3	61.0	31.7
50-84	344.9	30.1	3.3	236.0	75.5
Less than 50	958.0	42.3	11.9	676.4	227.4
All classes	1,458.7	111.2	16.7	987.0	343.8

Table 14.--Area of land by land class, Iowa, 1954 and 1974

(In thousand acres)

Land class	1954 1/	1974
Commercial forest land:	2,296.8	1,458.7
Noncommercial forest land:		
Unproductive	26.7	26.7
Productive-reserved	25.0	75.9
Subtotal	51.7	102.6
Nonforest land:	33,520.5	34,306.3
Total	35,869.0	35,867.6

1/ Figures have been adjusted from those published previously for 1954 to conform to 1974 land classes because of changes in survey definitions.

Table 15.--Area of commercial forest land by forest type and ownership class, Iowa, 1974

(In thousand acres)

Forest type	All owners	Ownership class			
		Public	Forest industry	Farmer	Misc. private
Eastern redcedar-hardwood	34.9	--	.2	34.7	--
White oak-red oak-hickory	514.8	18.0	7.1	384.9	104.8
White oak	150.1	10.9	2.4	104.4	32.4
Bur oak	148.7	4.7	1.6	83.3	59.1
Elm-ash-cottonwood	404.1	68.6	3.4	242.6	89.5
Cottonwood	12.3	3.1	--	6.2	3.0
Hard maple-basswood	143.6	2.4	1.5	98.5	41.2
Aspen	7.8	--	--	7.8	--
Nonstocked	42.4	3.5	.5	24.6	13.8
All types	1,458.7	111.2	16.7	987.0	343.8

Table 16.--Area of commercial forest land by stand-volume class and ownership class, Iowa, 1974

(In thousand acres)

Stand volume per acre (board feet)[1/]	All owners	Ownership class			
		Public	Forest industry	Farmer	Misc. private
Less than 1,500	694.1	38.2	10.7	486.9	158.3
1,500-5,000	612.1	44.3	6.0	420.0	141.8
More than 5,000	152.5	28.7	--	80.1	43.7
All classes	1,458.7	111.2	16.7	987.0	343.8

[1/] International 1/4-inch rule.

Table 17.--Area of commercial forest land by forest type and site-index class, Iowa, 1974

(In thousand acres)

Forest types	All sites	Site-index class (Height in feet at 50 years)						
		31-40	41-50	51-60	61-70	71-80	81-90	91+
Eastern redcedar-hardwood	34.9	19.7	--	7.8	3.6	3.8	--	--
White oak-red oak-hickory	514.8	19.2	112.0	175.8	114.8	65.3	21.8	5.9
White oak	150.1	4.3	30.1	57.7	47.6	8.5	1.9	--
Bur oak	148.7	23.2	46.6	59.8	13.1	6.0	--	--
Elm-ash-cottonwood	404.1	2.9	24.7	77.9	100.2	108.8	40.4	49.2
Cottonwood	12.3	--	--	2.1	2.0	--	2.0	6.2
Hard maple-basswood	143.6	3.0	25.7	50.7	37.2	17.1	4.7	5.2
Aspen	7.8	--	--	--	--	5.2	2.6	--
Nonstocked	42.4	--	17.2	12.6	4.7	7.9	--	--
All types	1,458.7	72.3	256.3	444.4	323.2	222.6	73.4	66.5

Table 18.--Area of commercial forest land by forest type and stand-age class, Iowa, 1974

(In thousand acres)

Forest types	All ages	Stand-age class (years)											
		0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	100-119	120+
Eastern redcedar-hardwood	34.9	--	19.4	11.2	4.3	--	--	--	--	--	--	--	--
White oak-red oak-hickory	514.8	46.3	41.8	69.0	72.2	41.9	40.5	58.2	49.4	35.4	39.4	13.7	7.0
White oak	150.1	--	--	2.3	27.0	13.9	12.0	11.8	13.6	18.3	28.7	22.5	--
Bur oak	148.7	2.6	12.9	5.6	11.3	22.6	7.6	17.5	28.2	20.7	9.1	8.4	2.2
Elm-ash-cottonwood	404.1	29.1	52.9	46.0	61.6	73.2	50.0	26.8	18.1	22.5	21.2	2.7	--
Cottonwood	12.3	--	2.0	2.1	2.0	2.1	--	2.0	--	2.1	--	--	--
Hard maple-basswood	143.6	15.1	7.2	7.0	4.8	2.2	15.6	25.0	18.2	33.3	4.8	10.4	--
Aspen	7.8	--	2.6	--	--	--	2.8	--	2.6	--	--	--	--
Nonstocked	42.4	37.3	5.1	--	--	--	--	--	--	--	--	--	--
All types	1,458.7	130.4	143.9	143.2	183.2	155.9	128.3	141.3	130.1	132.3	103.2	57.7	9.2

Table 19.--Area of commercial forest land by forest type, stand-size class, and Forest Survey Unit, Iowa, 1974

(In thousand acres)

Forest type	All stands	Sawtimber stands	Poletimber stands	Sapling and seedling stands	Nonstocked areas
NORTHEASTERN					
Eastern redcedar-hardwood	11.5	--	--	11.5	--
White oak-red oak-hickory	198.4	121.6	61.2	15.6	--
White oak	34.9	26.3	8.6	--	--
Bur oak	41.9	31.9	5.3	4.7	--
Elm-ash-cottonwood	155.1	103.7	35.6	15.8	--
Cottonwood	--	--	--	--	--
Hard maple-basswood	109.8	83.9	12.5	13.4	--
Aspen	7.8	7.8	--	--	--
Nonstocked	25.1	--	--	--	25.1
All types	584.5	375.2	123.2	61.0	25.1
SOUTHEASTERN					
Eastern redcedar-hardwood	10.6	--	--	10.6	--
White oak-red oak-hickory	272.6	96.1	95.0	81.5	--
White oak	107.1	67.5	39.6	--	--
Bur oak	62.0	38.9	6.6	16.5	--
Elm-ash-cottonwood	177.9	108.0	33.5	36.4	--
Cottonwood	--	--	--	--	--
Hard maple-basswood	18.8	6.3	4.7	7.8	--
Aspen	--	--	--	--	--
Nonstocked	10.4	--	--	--	10.4
All types	659.4	316.8	179.4	152.8	10.4
WESTERN					
Eastern redcedar-hardwood	12.8	--	--	12.8	--
White oak-red oak-hickory	43.8	9.2	12.7	21.9	--
White oak	8.1	--	8.1	--	--
Bur oak	44.8	19.2	25.6	--	--
Elm-ash-cottonwood	71.1	39.1	7.6	24.4	--
Cottonwood	12.3	12.3	--	--	--
Hard maple-basswood	15.0	9.6	--	5.4	--
Aspen	--	--	--	--	--
Nonstocked	6.9	--	--	--	6.9
All types	214.8	89.4	54.0	64.5	6.9
ALL UNITS					
Eastern redcedar-hardwood	34.9	--	--	34.9	--
White oak-red oak-hickory	514.8	226.9	168.9	119.0	--
White oak	150.1	93.8	56.3	--	--
Bur oak	148.7	90.0	37.5	21.2	--
Elm-ash-cottonwood	404.1	250.8	76.7	76.6	--
Cottonwood	12.3	12.3	--	--	--
Hard maple-basswood	143.6	99.8	17.2	26.6	--
Aspen	7.8	7.8	--	--	--
Nonstocked	42.4	--	--	--	42.4
All types	1,458.7	781.4	356.6	278.3	42.4

Table 20.--Area of commercial forest land by forest type and area-condition class, Iowa, 1974

(In thousand acres)

Forest type	All classes	Area-condition class					
		20	30	40	50	60	70
Eastern redcedar-hardwood	34.9	--	--	--	--	8.5	26.4
White oak-red oak-hickory	514.8	--	--	--	32.9	202.7	279.2
White oak	150.1	--	--	--	13.0	92.1	45.0
Bur oak	148.7	--	--	--	--	41.0	107.7
Elm-ash-cottonwood	404.1	--	--	--	37.7	103.7	262.7
Cottonwood	12.3	2.1	--	2.0	--	2.1	6.1
Hard maple-basswood	143.6	--	--	--	16.0	51.6	76.0
Aspen	7.8	--	--	--	--	--	7.8
Nonstocked	42.4	--	--	--	--	--	42.4
All types	1,458.7	2.1	--	2.0	99.6	501.7	853.3

Table 21.--Area of commercial forest land [illegible] type, stand-size class and site class, Iowa, 1974

(In thousand acres)

Forest type and stand-size class	All classes	Site class (cubic feet of growth/acre/year)					
		225+	165-225	120-165	85-120	50-85	Less than 50
Eastern redcedar-hardwood							
Sawtimber	--	--	--	--	--	--	--
Poletimber	--	--	--	--	--	--	--
Sapling and seedling	34.9	--	--	--	--	3.8	31.1
All stands	34.9	--	--	--	--	3.8	31.1
White oak-red oak-hickory							
Sawtimber	226.9	--	--	--	2.8	48.7	175.4
Poletimber	168.9	3.4	--	--	8.6	51.2	105.7
Sapling and seedling	119.0	--	--	--	3.1	24.5	91.4
All stands	514.8	3.4	--	--	14.5	124.4	372.5
White oak							
Sawtimber	93.8	--	--	--	--	15.1	78.7
Poletimber	56.3	--	--	--	--	12.7	43.6
Sapling and seedling	--	--	--	--	--	--	--
All stands	150.1	--	--	--	--	27.8	122.3
Bur oak							
Sawtimber	90.0	--	--	--	--	8.7	81.3
Poletimber	37.5	--	--	--	--	4.8	32.7
Sapling and seedling	21.2	--	--	--	--	2.6	18.6
All stands	148.7	--	--	--	--	16.1	132.6
Elm-ash-cottonwood							
Sawtimber	250.8	--	--	19.0	50.8	86.6	94.4
Poletimber	76.7	--	--	5.9	14.3	24.2	32.3
Sapling and seedling	76.6	--	--	5.3	16.3	10.1	44.9
All stands	404.1	--	--	30.2	81.4	120.9	171.6
Cottonwood							
Sawtimber	12.3	--	--	4.1	4.1	2.0	2.1
Poletimber	--	--	--	--	--	--	--
Sapling and seedling	--	--	--	--	--	--	--
All stands	12.3	--	--	4.1	4.1	2.0	2.1
Hard maple-basswood							
Sawtimber	99.8	--	--	3.0	7.4	25.2	64.2
Poletimber	17.2	--	--	--	2.5	4.8	9.9
Sapling and seedling	26.6	--	--	--	--	4.5	22.1
All stands	143.6	--	--	3.0	9.9	34.5	96.2
Aspen							
Sawtimber	7.8	--	--	--	5.2	--	2.6
Poletimber	--	--	--	--	--	--	--
Sapling and seedling	--	--	--	--	--	--	--
All stands	7.8	--	--	--	5.2	--	2.6
Nonstocked	42.4	--	--	--	--	15.4	27.0
All types							
Sawtimber	781.4	--	--	26.1	70.3	186.3	498.7
Poletimber	356.6	3.4	--	5.9	25.4	97.7	224.2
Sapling and seedling	278.3	--	--	5.3	19.4	45.5	208.1
Nonstocked	42.4	--	--	--	--	15.4	27.0
All stands	1,458.7	3.4	--	37.3	115.1	344.9	958.0

Table 22.--Area of commercial forest land by forest type and basal area class, Iowa, 1974

(In thousand acres)

Forest type	All classes	Basal area class (square feet per acre) 0-19	20-39	40-59	60-79	80-99	100-119	120-139	140-159	160-179	180+
Eastern redcedar-hardwood	34.9	4.3	11.3	7.7	11.6	--	--	--	--	--	--
White oak-red oak-hickory	514.8	15.5	82.7	135.7	127.2	84.2	60.6	8.9	--	--	--
White oak	150.1	--	2.6	36.6	44.7	33.3	19.3	11.4	2.2	--	--
Bur oak	148.7	--	8.3	58.4	47.2	27.2	4.4	3.2	--	--	--
Elm-ash-cottonwood	404.1	18.2	73.9	88.7	75.0	64.9	54.1	18.9	5.2	5.2	--
Cottonwood	12.3	--	--	2.0	6.2	--	--	--	--	4.1	--
Hard maple-basswood	143.6	12.8	16.4	25.7	22.5	29.1	22.8	9.9	2.2	2.2	--
Aspen	7.8	--	--	7.8	--	--	--	--	--	--	--
Nonstocked	42.4	--	17.2	10.3	7.4	2.4	5.1	--	--	--	--
All types	1,458.7	50.8	212.4	372.9	341.8	241.1	166.3	52.3	9.6	11.5	--

Table 23.--Area of commercial forest land by stocking class based on selected stand components, Iowa, 1974

(In thousand acres)

Stocking percentage	All live trees	Growing-stock trees Total	Desirable	Acceptable	Rough and rotten trees
160+	203.1	8.2	--	8.2	199.0
150-159	2.3	--	--	--	2.3
140-149	633.9	38.8	--	38.8	631.6
130-139	39.7	20.0	--	20.0	2.2
120-129	68.1	4.5	--	--	4.9
110-119	98.8	18.9	--	7.3	10.0
100-109	86.4	20.3	--	9.5	13.2
90-99	98.1	35.1	--	20.4	7.6
80-89	72.0	80.1	--	69.4	19.1
70-79	68.9	50.0	--	48.5	31.3
60-69	38.4	68.4	--	68.6	39.3
50-59	25.9	71.4	2.3	88.7	74.3
40-49	18.3	174.5	7.4	192.6	116.4
30-39	--	98.1	11.7	102.8	131.8
20-29	--	81.1	27.9	88.8	75.6
10-19	4.8	29.0	46.7	34.8	62.9
Less than 10	--	660.3	1,362.7	660.3	37.2
Total	1,458.7	1,458.7	1,458.7	1,458.7	1,458.7

Table 24.--Area of commercial forest land by stocking class of growing-stock trees and stand-size class, Iowa, 1974

(In thousand acres)

Stocking percentage	All stands	Sawtimber stands	Poletimber stands	Sapling and seedling stands	Nonstocked areas
Less than 17	675.1	239.0	188.8	204.9	42.4
18-60	439.2	277.3	88.5	73.4	--
61-100	233.7	179.0	54.7	--	--
101-133	43.6	26.9	16.7	--	--
134+	67.1	59.2	7.9	--	--
All classes	1,458.7	781.4	356.6	278.3	42.4

Table 25.--Area of noncommercial forest land by forest type, Iowa, 1974

(In thousand acres)

Forest type	All areas	Productive-reserved areas	Unproductive areas
Christmas tree plantation	0.2	0.2	--
Eastern redcedar-hardwood	5.5	--	5.5
White oak-red oak-hickory	67.6	46.4	21.2
Elm-ash-cottonwood	29.0	29.0	--
Hard maple-basswood	0.3	0.3	--
All types	102.6	75.9	26.7

Table 26.--Area of noncommercial forest land by ownership class, Iowa, 1974

(In thousand acres)

Ownership class	All areas	Productive-reserved areas	Unproductive areas
Federal	34.3	34.3	--
State	20.2	20.2	--
County and municipal	21.4	21.4	--
Forest industry	--	--	--
Farmer	26.7	--	26.7
Miscellaneous private			
Individual	--	--	--
Corporate	--	--	--
All owners	102.6	75.9	26.7

Table 27.--Number of all live trees on commercial forest land by species and diameter class, Iowa, 1974

(In thousand trees)

Species	All classes	Diameter class (inches at breast height) 1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
Softwoods:															
White and red pine	9	--	--	--	--	--	--	--	9	--	--	--	--	--	--
Eastern redcedar	13,160	7,556	3,160	1,168	728	325	145	53	16	9	--	--	--	--	--
Other softwoods	99	--	65	34	--	--	--	--	--	--	--	--	--	--	--
Total	13,268	7,556	3,225	1,202	728	325	145	53	25	9	--	--	--	--	--
Hardwoods:															
Select white oaks	54,411	13,613	11,274	7,944	7,300	4,650	2,851	2,486	1,686	1,108	613	373	409	104	--
Select red oaks	18,084	3,314	2,993	2,020	2,549	2,000	1,658	1,245	791	544	384	235	273	73	5
Other white oaks	634	303	--	172	101	18	--	22	9	6	--	3	--	--	--
Other red oaks	15,933	4,733	3,435	2,841	1,643	1,186	953	494	228	224	77	40	51	26	2
Hickory	72,068	38,738	18,374	7,525	3,494	1,832	1,140	511	267	127	37	5	15	3	--
Hard maple	11,837	5,577	1,791	1,540	790	649	406	411	204	224	99	43	92	11	--
Soft maple	32,721	13,099	9,355	3,131	2,228	1,458	1,366	818	415	252	182	150	146	106	15
Ash	22,295	13,925	2,747	2,254	1,483	785	386	234	160	83	99	64	53	22	--
Cottonwood	3,732	203	465	646	332	358	418	273	250	159	174	112	211	97	34
Aspen	10,422	5,334	2,454	998	601	533	373	72	14	23	9	8	3	--	--
Basswood	26,054	12,427	5,371	2,558	1,720	1,427	736	725	457	272	136	112	97	15	1
Elm	90,002	54,510	17,520	8,481	4,312	2,068	1,101	735	505	307	190	112	129	27	5
Black walnut	10,554	3,449	2,172	1,485	1,453	861	470	329	181	75	51	19	9	--	--
Black cherry	11,160	4,102	3,429	1,873	855	375	271	154	50	40	9	--	--	2	--
Hackberry	18,084	10,643	4,652	1,327	557	498	133	84	63	37	26	13	41	7	3
Willow	19,142	10,451	3,062	2,376	1,269	697	471	327	237	140	55	35	22	--	--
Birch	4,492	2,442	395	545	299	310	164	219	59	22	23	3	9	2	--
Other hardwoods	29,595	12,562	6,336	4,149	2,816	1,864	795	447	305	131	81	30	52	23	4
Noncommercial species	103,215	85,436	13,982	3,155	536	102	--	--	--	--	4	--	--	--	--
Total	554,435	294,861	109,807	55,020	34,338	21,671	13,692	9,586	5,881	3,774	2,249	1,357	1,612	518	69
All species	567,703	302,417	113,032	56,222	35,066	21,996	13,837	9,639	5,906	3,783	2,249	1,357	1,612	518	69

Table 28.--Number of growing-stock trees on commercial forest land by species and diameter class, Iowa, 1974

(In thousand trees)

Species	All classes	Diameter class (inches at breast height) 1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
Softwoods:															
White and red pine	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Eastern redcedar	8,672	5,887	1,377	674	515	89	74	39	8	9	--	--	--	--	--
Other softwoods	99	--	64	35	--	--	--	--	--	--	--	--	--	--	--
Total	8,771	5,887	1,441	709	515	89	74	39	8	9	--	--	--	--	--
Hardwoods:															
Select white oaks	34,754	5,233	7,747	5,933	5,742	3,361	1,985	1,936	1,236	719	394	192	241	35	--
Select red oaks	12,879	1,858	2,565	1,437	2,039	1,334	1,122	964	568	421	248	150	145	27	1
Other white oaks	264	--	--	113	101	19	--	22	--	6	--	3	--	--	--
Other red oaks	9,602	2,680	2,089	1,608	1,068	866	617	342	108	127	40	20	24	11	2
Hickory	52,068	25,174	14,228	6,360	3,031	1,589	949	416	200	83	32	--	6	--	--
Hard maple	8,757	3,730	1,698	1,133	680	537	251	314	174	117	59	18	45	1	--
Soft maple	20,951	7,847	5,951	2,082	1,468	1,150	926	640	285	190	164	94	91	56	7
Ash	14,636	8,676	1,822	1,790	973	606	331	151	116	48	64	25	24	10	--
Cottonwood	3,336	203	465	439	251	344	392	273	242	158	171	109	194	75	20
Aspen	5,083	2,184	898	821	402	358	314	54	14	23	9	3	3	--	--
Basswood	15,256	6,815	3,247	1,578	1,015	1,026	442	487	352	163	54	42	29	6	--
Elm	49,443	25,745	12,065	5,280	2,898	1,551	689	483	304	202	84	62	67	12	1
Black walnut	6,736	869	1,925	1,284	1,148	612	354	309	146	46	32	11	--	--	--
Black cherry	6,071	2,816	1,508	819	495	145	183	87	14	--	4	--	--	--	--
Hackberry	12,115	6,119	3,951	987	423	341	109	54	39	27	16	14	33	2	--
Willow	8,679	3,305	1,784	1,368	802	619	358	202	130	69	23	7	12	--	--
Birch	1,929	636	73	356	220	252	138	148	54	22	18	4	8	--	--
Other hardwoods	7,365	1,786	2,939	864	832	568	109	107	80	40	18	8	11	3	--
Noncommercial species	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	269,924	105,676	64,955	34,252	23,588	15,278	9,269	6,989	4,062	2,461	1,430	762	93	23	31
All species	278,695	111,563	66,396	34,961	24,103	15,367	9,343	7,028	4,070	2,470	1,430	762	933	238	31

Table 29.--Number of growing-stock trees on commercial forest land by softwoods and hardwoods, diameter class, and Forest Survey Unit, Iowa, 1974

(In thousand trees)

Species group	All classes	1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
						NORTHEASTERN									
						Diameter class (inches at breast height)									
Softwoods	5,266	3,952	782	435	62	35	--	--	--	--	--	--	--	--	--
Hardwoods	98,312	36,913	21,250	12,361	8,707	6,856	4,446	3,409	1,924	1,149	571	335	327	58	6
All species	103,578	40,865	22,032	12,796	8,769	6,891	4,446	3,409	1,924	1,149	571	335	327	58	6
						SOUTHEASTERN									
Softwoods	1,264	656	105	135	225	54	56	25	8	--	--	--	--	--	--
Hardwoods	136,358	54,172	35,269	17,433	11,337	6,838	4,115	2,938	1,702	1,068	636	319	410	112	9
All species	137,622	54,828	35,374	17,568	11,562	6,892	4,171	2,963	1,710	1,068	636	319	410	112	9
						WESTERN									
Softwoods	2,241	1,279	554	139	228	--	18	14	--	9	--	--	--	--	--
Hardwoods	35,254	14,591	8,436	4,458	3,544	1,584	708	642	436	244	223	108	196	68	16
All species	37,495	15,870	8,990	4,597	3,772	1,584	726	656	436	253	223	108	196	68	16
						ALL UNITS									
Softwoods	8,771	5,887	1,441	709	515	89	74	39	8	9	--	--	--	--	--
Hardwoods	269,924	105,676	64,955	34,252	23,588	15,278	9,269	6,989	4,062	2,461	1,430	762	933	238	31
All species	278,695	111,563	66,396	34,961	24,103	15,367	9,343	7,028	4,070	2,470	1,430	762	933	238	31

Table 30.--Number of short-log trees on commercial forest land by species and diameter class, Iowa, 1974

(In thousand trees)

Species	All classes	Diameter class (inches at breast height) 9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
Softwoods:											
White and red pine	--	--	--	--	--	--	--	--	--	--	--
Eastern redcedar	158	158	--	--	--	--	--	--	--	--	--
Other softwoods	--	--	--	--	--	--	--	--	--	--	--
Total	158	158	--	--	--	--	--	--	--	--	--
Hardwoods:											
Select white oaks	1,287	--	522	237	143	200	65	61	45	14	--
Select red oaks	248	--	98	50	16	30	21	13	11	8	1
Other white oaks	--	--	--	--	--	--	--	--	--	--	--
Other red oaks	222	--	76	60	29	35	5	7	4	6	--
Hickory	166	--	96	31	16	23	--	--	--	--	--
Hard maple	134	--	40	48	--	35	5	--	6	--	--
Soft maple	322	--	141	59	47	34	4	16	9	11	1
Ash	78	--	42	--	--	17	4	8	3	4	--
Cottonwood	23	--	15	--	--	--	--	--	2	4	2
Aspen	--	--	--	--	--	--	--	--	--	--	--
Basswood	181	--	101	37	7	12	19	4	1	--	--
Elm	483	--	202	121	86	40	16	7	9	2	--
Black walnut	122	--	64	21	18	5	9	5	--	--	--
Black cherry	29	--	12	--	--	17	--	--	--	--	--
Hackberry	46	--	24	12	7	--	--	--	--	--	3
Willow	112	--	--	51	36	11	--	9	5	--	--
Birch	7	--	--	7	--	--	--	--	--	--	--
Other hardwoods	133	--	73	38	12	--	4	3	3	--	--
Noncommercial species	--	--	--	--	--	--	--	--	--	--	--
Total	3,593	--	1,506	772	417	459	152	133	98	49	7
All species	3,751	158	1,506	772	417	459	152	133	98	49	7

Table 31.--Net volume of growing stock and sawtimber on commercial forest land by softwoods and hardwoods, Iowa, 1954 and 1974

Species group	Growing stock 1954[1]	Growing stock 1974	Sawtimber 1954[1]	Sawtimber 1974
	Million cubic feet		Million board feet[2]	
Softwoods	3.7	5.8	6.0	11.5
Hardwoods	1,345.1	1,048.9	4,946.0	3,475.0
All species	1,348.8	1,054.7	4,952.0	3,486.5

[1] Figures have been adjusted from those published previously for 1954 to conform to 1974 because of changes in survey definitions.

[2] International 1/4-inch rule.

Table 32.--Net volume of growing stock on commercial forest land by species and diameter class, Iowa, 1974

(In million cubic feet)

Species	All classes	Diameter class (inches at breast height) 5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
Softwoods:													
White and red pine	--	--	--	--	--	--	--	--	--	--	--	--	--
Eastern redcedar	5.7	1.3	2.0	0.7	0.7	0.6	0.2	0.2	--	--	--	--	--
Other softwoods	0.1	0.1	--	--	--	--	--	--	--	--	--	--	--
Total	5.8	1.4	2.0	0.7	0.7	0.6	0.2	0.2	--	--	--	--	--
Hardwoods:													
Select white oaks	231.7	13.8	27.5	27.9	25.9	36.7	31.1	23.4	15.7	9.4	15.9	4.4	--
Select red oaks	126.3	4.0	10.7	12.2	15.3	18.7	15.7	15.4	11.2	8.3	11.1	3.1	0.6
Other white oaks	1.6	0.3	0.4	0.1	--	0.4	--	0.2	--	0.2	--	--	--
Other red oaks	43.2	3.3	5.0	7.4	7.8	6.3	2.8	4.2	1.8	1.0	1.6	1.5	0.5
Hickory	78.7	16.0	15.8	15.2	13.5	8.3	5.4	2.6	1.4	--	0.5	--	--
Hard maple	38.3	3.3	3.8	5.0	3.6	6.4	4.8	4.2	2.5	1.2	3.3	0.2	--
Soft maple	109.5	5.8	8.9	12.1	15.2	15.2	10.1	9.0	9.5	6.1	7.6	8.1	1.9
Ash	35.3	4.3	5.1	5.3	4.7	3.0	3.2	2.2	3.1	1.6	1.9	0.9	--
Cottonwood	91.7	1.5	1.5	3.6	6.8	6.8	8.1	7.0	9.7	8.1	20.3	12.8	5.5
Aspen	17.4	2.2	3.0	3.7	5.0	1.2	0.4	1.0	0.4	0.2	0.3	--	--
Basswood	57.7	3.6	5.3	9.6	6.6	9.8	9.5	5.9	2.5	2.1	2.0	0.8	--
Elm	95.4	12.8	16.9	14.2	10.1	9.8	8.4	8.0	4.0	4.0	5.3	1.6	0.3
Black walnut	31.8	3.0	5.9	5.3	4.7	5.8	3.5	1.4	1.6	0.6	--	--	--
Black cherry	11.5	2.1	2.6	1.5	2.8	1.9	0.4	--	0.2	--	--	--	--
Hackberry	15.9	2.1	2.1	2.7	1.6	1.2	1.0	0.9	0.8	0.7	2.6	0.2	--
Willow	31.0	3.3	4.4	5.8	5.1	4.3	3.3	2.7	1.0	0.4	0.7	--	--
Birch	14.1	0.9	1.4	2.3	2.1	3.1	1.7	0.9	0.8	0.2	0.7	--	--
Other hardwoods	17.8	1.8	3.4	3.9	1.3	1.8	2.1	1.0	0.8	0.5	0.9	0.3	--
Total	1,048.9	84.1	123.7	137.8	132.1	140.7	111.5	90.0	67.0	44.6	74.7	33.9	8.8
All species	1,054.7	85.5	125.7	138.5	132.8	141.3	111.7	90.2	67.0	44.6	74.7	33.9	8.8

Table 33.--Net volume of sawtimber on commercial forest land by species and diameter class, Iowa, 1974

(In million board feet)[1/]

Species	All classes	Diameter class (inches at breast height) 9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
Softwoods:											
White and red pine	--	--	--	--	--	--	--	--	--	--	--
Eastern redcedar	11.5	3.8	2.9	2.3	1.1	1.4	--	--	--	--	--
Other softwoods	--	--	--	--	--	--	--	--	--	--	--
Total	11.5	3.8	2.9	2.3	1.1	1.4	--	--	--	--	--
Hardwoods:											
Select white oaks	812.4	--	129.2	182.0	156.1	116.3	82.3	48.9	81.1	16.5	--
Select red oaks	511.2	--	79.1	99.6	80.4	75.0	60.8	42.6	56.4	15.6	1.7
Other white oaks	4.7	--	--	2.4	--	1.4	--	0.9	--	--	--
Other red oaks	144.2	--	42.0	33.3	14.3	22.3	8.4	5.4	8.4	8.4	1.7
Hickory	[illegible].5	--	71.3	42.4	27.3	14.8	6.8	--	1.9	--	--
Hard maple	137.0	--	21.9	36.1	24.0	23.0	11.9	5.0	14.6	0.5	--
Soft maple	361.7	--	65.4	70.1	44.8	39.3	42.6	27.2	35.5	31.9	4.9
Ash	99.1	--	19.9	14.9	17.6	9.7	15.6	7.5	9.9	4.0	--
Cottonwood	436.4	--	31.9	35.3	40.7	36.9	53.3	42.4	105.2	63.9	26.8
Aspen	37.6	--	21.8	4.7	2.3	4.7	1.8	1.1	1.2	--	--
Basswood	199.4	--	32.7	52.9	48.8	30.6	10.9	10.5	9.7	3.3	--
Elm	243.2	--	48.7	46.9	42.0	36.6	19.0	18.6	24.7	5.9	0.8
Black walnut	88.3	--	22.6	28.5	18.6	8.7	7.2	2.7	--	--	--
Black cherry	23.6	--	12.7	8.4	1.6	--	0.9	--	--	--	--
Hackberry	43.2	--	9.4	6.0	4.9	4.5	3.7	2.9	11.2	0.6	--
Willow	82.0	--	23.9	20.2	16.1	11.9	5.2	1.6	3.1	--	--
Birch	43.4	--	9.1	15.0	7.7	4.0	3.4	0.9	3.3	--	--
Other hardwoods	43.1	--	6.5	8.9	10.9	5.6	3.8	1.6	4.4	1.4	--
Total	3,475.0	--	648.1	707.6	558.1	445.3	337.6	219.8	370.6	152.0	35.9
All species	3,486.5	3.8	651.0	709.9	559.2	446.7	337.6	219.8	370.6	152.0	35.9

[1/] International 1/4-inch rule.

Table 34.--Net volume of short-log trees on commercial forest land by species and diameter class, Iowa, 1974

(In million board feet)[1/]

Species	All classes	Diameter class (inches at breast height) 9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0-38.9	39.0+
Softwoods:											
White and red pine	--	--	--	--	--	--	--	--	--	--	--
Eastern redcedar	4.4	4.4	--	--	--	--	--	--	--	--	--
Other softwoods	--	--	--	--	--	--	--	--	--	--	--
Total	4.4	4.4	--	--	--	--	--	--	--	--	--
Hardwoods:											
Select white oaks	82.7	--	16.3	11.2	10.6	17.8	7.3	8.3	8.3	2.9	--
Select red oaks	17.0	--	3.8	2.8	1.0	2.7	1.9	1.5	1.7	1.4	0.2
Other white oaks	--	--	--	--	--	--	--	--	--	--	--
Other red oaks	14.0	--	3.1	3.2	1.8	2.7	0.4	0.8	0.6	1.4	--
Hickory	8.0	--	3.7	1.7	0.9	1.7	--	--	--	--	--
Hard maple	10.0	--	2.1	2.8	--	3.1	0.6	--	1.4	--	--
Soft maple	19.1	--	5.9	3.3	2.9	2.7	0.4	1.4	1.1	1.2	0.2
Ash	6.2	--	1.7	--	--	1.2	0.4	0.9	0.5	1.5	--
Cottonwood	3.1	--	0.7	--	--	--	--	--	0.5	0.7	1.2
Aspen	--	--	--	--	--	--	--	--	--	--	--
Basswood	7.3	--	3.0	0.2	0.3	0.1	1.5	1.2	1.0	--	--
Elm	25.1	--	7.5	5.6	5.7	2.9	1.5	0.5	1.0	0.4	--
Black walnut	6.6	--	2.3	1.2	1.4	.4	0.9	0.4	--	--	--
Black cherry	1.6	--	0.3	--	--	1.3	--	--	--	--	--
Hackberry	3.7	--	0.9	0.6	0.5	--	--	--	--	--	1.7
Willow	4.9	--	--	2.2	1.4	1.3	--	--	--	--	--
Birch	0.2	--	--	0.2	--	--	--	--	--	--	--
Other hardwoods	6.4	--	3.2	1.6	0.7	--	0.4	0.2	0.3	--	--
Total	215.9	--	54.5	36.6	27.2	37.9	15.3	15.2	16.4	9.5	3.3
All species	220.3	4.4	54.5	36.6	27.2	37.9	15.3	15.2	16.4	9.5	3.3

[1/] International 1/4-inch rule.

Table 35.--Net volume of growing stock on commercial forest land by species and forest type, Iowa, 1974

(In million cubic feet)

Species	All types	Forest types							
		Eastern redcedar-hardwood	White oak-red oak-hickory	White oak	Bur oak	Elm-ash-cotton-wood	Cotton-wood	Sugar maple-basswood	Aspen
Softwoods:									
White and red pine	--	--	--	--	--	--	--	--	--
Eastern redcedar	5.7	3.8	0.6	0.4	0.5	--	--	0.4	--
Other softwoods	0.1	--	0.1	--	--	--	--	--	--
Total	5.8	3.8	0.7	0.4	0.5	--	--	0.4	--
Hardwoods:									
Select white oaks	231.7	1.2	63.4	91.0	56.5	11.3	--	8.1	0.2
Select red oaks	126.3	--	93.6	12.2	2.7	3.1	--	14.5	0.2
Other white oaks	1.6	--	0.5	1.0	0.1	--	--	--	--
Other red oaks	43.2	0.5	27.6	10.2	3.6	1.2	--	0.1	--
Hickory	78.7	0.8	58.4	7.2	3.5	3.5	--	5.3	--
Hard maple	38.3	--	11.4	0.6	--	2.2	--	24.1	--
Soft maple	109.5	--	0.5	0.7	1.7	106.4	--	0.2	--
Ash	35.3	0.4	8.4	2.8	0.7	20.3	--	2.7	--
Cottonwood	91.7	0.7	2.7	--	0.8	60.5	26.8	0.2	--
Aspen	17.4	--	7.0	1.1	0.4	4.0	--	2.3	2.6
Basswood	57.7	0.3	12.7	3.5	3.0	4.2	--	34.0	--
Elm	95.4	--	24.8	5.8	7.4	33.2	0.2	23.8	0.2
Black walnut	31.8	0.6	8.9	3.0	2.1	13.0	0.6	3.6	--
Black cherry	11.5	--	6.0	0.8	0.2	3.5	--	0.8	0.2
Hackberry	15.9	--	2.1	0.2	1.4	11.3	0.1	0.8	--
Willow	31.0	--	--	--	0.2	30.7	0.1	--	--
Birch	14.1	0.7	1.7	--	0.2	10.9	--	0.6	--
Other hardwoods	17.8	--	4.8	0.4	1.0	9.0	0.6	2.0	--
Total	1,048.9	5.2	334.5	140.5	85.5	328.3	28.4	123.1	3.4
All species	1,054.7	9.0	335.2	140.9	86.0	328.3	28.4	123.5	3.4

Table 36.--Net volume of sawtimber on commercial forest land by species and forest type, Iowa, 1974

(In million board feet)[1/]

Species	All types	Forest types							
		Eastern redcedar-hardwood	White oak-red oak-hickory	White oak	Bur Oak	Elm-ash-cotton-wood	Cotton wood	Sugar maple-basswood	Aspen
Softwoods:									
White and red pine	--	--	--	--	--	--	--	--	--
Eastern redcedar	11.5	6.6	2.1	1.5	1.3	--	--	--	--
Other softwoods	--	--	--	--	--	--	--	--	--
Total	11.5	6.6	2.1	1.5	1.3	--	--	--	--
Hardwoods:									
Select white oaks	812.4	4.3	202.8	322.5	202.6	47.5	--	31.5	1.2
Select red oaks	511.2	--	375.4	48.4	10.2	13.4	--	62.5	1.3
Other white oaks	4.7	--	1.4	2.6	0.7	--	--	--	--
Other red oaks	144.2	--	90.1	36.8	12.6	4.7	--	--	--
Hickory	164.5	--	112.4	18.5	10.1	11.1	--	12.4	--
Hard maple	137.0	--	37.6	0.7	--	9.6	--	89.1	--
Soft maple	361.7	--	0.9	2.5	4.1	353.6	--	0.6	--
Ash	99.1	0.6	14.4	2.8	1.5	73.1	--	6.7	--
Cottonwood	436.4	1.8	12.4	--	3.4	284.3	133.3	1.2	--
Aspen	37.6	--	13.9	2.8	--	12.0	--	2.0	6.9
Basswood	199.4	--	39.0	6.7	8.3	16.1	--	129.3	--
Elm	243.2	--	62.3	8.8	17.8	81.7	--	71.4	1.2
Black walnut	88.3	2.4	27.4	4.2	5.0	34.4	.7	14.2	--
Black cherry	23.6	--	8.6	1.4	0.8	9.5	--	2.3	1.0
Hackberry	43.2	--	4.8	--	3.9	33.3	--	1.2	--
Willow	82.0	--	--	--	0.9	81.1	--	--	--
Birch	43.4	2.6	4.1	--	--	35.3	--	1.4	--
Other hardwoods	43.1	--	7.9	1.3	1.2	24.5	1.7	6.5	--
Total	3,475.0	11.7	1,015.4	460.0	283.1	1,125.2	135.7	432.3	11.6
All species	3,486.5	18.3	1,017.5	461.5	284.4	1,125.2	135.7	432.3	11.6

[1/] International 1/4-inch rule.

Table 37.--Net volume of growing stock on commercial forest land by species and Forest Survey Unit, Iowa, 1974

(In million cubic feet)

Species	All units	North-eastern	South-eastern	Western
Softwoods:				
White and red pine	--	--	--	--
Eastern redcedar	5.7	1.1	2.7	1.9
Other softwoods	0.1	0.1	--	--
Total	5.8	1.2	2.7	1.9
Hardwoods:				
Select white oaks	231.7	71.0	129.0	31.7
Select red oaks	126.3	64.5	57.8	4.0
Other white oaks	1.6	0.3	1.3	--
Other red oaks	43.2	16.4	26.5	0.3
Hickory	78.7	27.5	42.1	9.1
Hard maple	38.3	34.1	4.2	--
Soft maple	109.5	33.4	66.5	9.6
Ash	35.3	16.9	11.1	7.3
Cottonwood	91.7	22.2	34.1	35.4
Aspen	17.4	15.5	1.9	--
Basswood	57.7	36.7	16.9	4.1
Elm	95.4	66.5	16.3	12.6
Black walnut	31.8	16.5	10.8	4.5
Black cherry	11.5	8.5	2.6	0.4
Hackberry	15.9	2.7	10.5	2.7
Willow	31.0	10.8	12.0	8.2
Birch	14.1	10.8	3.3	--
Other hardwoods	17.8	4.5	12.1	1.2
Total	1,048.9	458.8	459.0	131.1
All species	1,054.7	460.0	461.7	133.0

Table 38.--Net volume of sawtimber on commercial forest land by species and Forest Survey Unit, Iowa, 1974

(In million board feet)[1/]

Species	All units	North-eastern	South-eastern	Western
Softwoods:				
White and red pine	--	--	--	--
Eastern redcedar	11.5	1.3	6.8	3.4
Other softwoods	--	--	--	--
Total	11.5	1.3	6.8	3.4
Hardwoods:				
Select white oaks	812.4	275.8	442.3	94.3
Select red oaks	511.2	275.3	220.2	15.7
Other white oaks	4.7	1.4	3.3	--
Other red oaks	144.2	61.2	83.0	--
Hickory	164.5	67.3	79.6	17.6
Hard maple	137.0	121.9	15.1	--
Soft maple	361.7	101.6	224.1	36.0
Ash	99.1	50.8	26.1	22.2
Cottonwood	436.4	102.8	162.9	170.7
Aspen	37.6	29.7	7.9	--
Basswood	199.4	132.8	46.9	19.7
Elm	243.2	170.4	34.0	38.8
Black walnut	88.3	47.4	29.8	11.1
Black cherry	23.6	19.7	3.9	--
Hackberry	43.2	5.4	32.5	5.3
Willow	82.0	34.6	36.2	11.2
Birch	43.4	31.9	11.5	--
Other hardwoods	43.1	8.9	31.5	2.7
Total	3,475.0	1,538.9	1,490.8	445.3
All species	3,486.5	1,540.2	1,497.6	448.7

[1/] International 1/4-inch rule.

Table 39.--Net volume of growing stock, sawtimber, and rough and rotten trees on commercial forest land by individual species, Iowa, 1974

Species	Growing stock	Rough and rotten trees[1]	Sawtimber
	Million cubic feet		Million board feet[2]
Softwoods:			
Eastern white pine	--	--	--
Red pine	--	--	--
Eastern redcedar	5.7	3.9	11.5
Balsam fir	0.1	--	--
Total	5.8	3.9	11.5
Hardwoods:			
Select white oaks			
White oak	148.3	29.8	515.6
Swamp white oak	4.7	1.0	15.6
Bur oak	77.8	44.9	278.4
Chinkapin oak	0.9	0.4	2.8
Select red oaks			
Northern red oak	126.3	23.9	511.2
Other white oaks			
Overcup oak	0.4	--	2.1
Post oak	1.2	0.2	2.6
Other red oaks			
Northern pin oak	6.0	2.3	26.4
Shingle oak	3.2	2.0	5.2
Pin oak	4.8	1.4	15.6
Black oak	29.2	11.0	97.0
Bitternut hickory	18.1	3.3	37.9
Shellbark hickory	0.4	--	0.7
Shagbark hickory	59.0	7.3	121.3
Mockernut hickory	1.2	--	4.6
Hard maple			
Black maple	13.0	2.6	36.9
Sugar maple	25.3	6.9	100.1
Soft maple			
Silver maple	109.5	29.1	361.7
White ash	10.1	2.6	15.5
Black ash	1.5	--	3.7
Green ash	23.7	6.3	79.9
Eastern cottonwood	91.7	6.1	436.4
Bigtooth aspen	7.9	0.8	14.8
Quaking aspen	9.5	1.6	22.8
American basswood	57.7	11.9	199.4
American elm	58.5	32.7	145.9
Slippery elm	36.7	8.6	96.6
Rock elm	0.2	0.1	0.7
Black walnut	31.8	6.3	88.3
Black cherry	11.5	8.1	23.6
Hackberry	15.9	4.7	43.2
Black willow	31.0	8.1	82.0
River birch	12.1	1.8	40.4
Paper birch	2.0	1.0	3.0
Other hardwoods			
Boxelder	5.0	17.0	7.9
Ohio buckeye	1.5	0.3	4.0
Honeylocust	5.0	8.3	14.2
Kentucky coffeetree	0.4	0.4	0.9
Butternut	2.6	1.3	7.1
Osage-orange	0.3	0.8	--
Red mulberry	0.2	1.6	--
American sycamore	2.2	0.4	9.0
Black locust	0.6	1.1	--
Noncommercial species	--	6.0	--
Total	1,048.9	304.0	3,475.0
Total all species	1,054.7	307.9	3,486.5

[1] Includes short-log trees.
[2] International 1/4-inch rule.

Table 40.--Net volume of growing stock and sawtimber on commercial forest land by ownership class and species group, Iowa, 1974

Ownership class	All species	Softwoods	Oaks	Other hardwoods
	GROWING STOCK			
	----------Million cubic feet----------			
Public	120.2	--	26.3	93.9
Forest industry	12.0	--	4.6	7.4
Farmer	660.1	5.1	265.1	389.9
Miscellaneous private	262.4	0.7	106.8	154.9
All ownerships	1,054.7	5.8	402.8	646.1
	SAWTIMBER			
	----------Million board feet[1/]----------			
Public	383.3	--	94.2	289.1
Forest industry	39.1	--	16.6	22.5
Farmer	2,194.0	11.5	996.0	1,186.5
Miscellaneous private	870.1	--	365.7	504.4
All ownerships	3,486.5	11.5	1,472.5	2,002.5

[1/] International 1/4-inch rule.

Table 41.--Net volume of timber on commercial forest land by class of timber and softwoods and hardwoods, Iowa, 1974

(In million cubic feet)

Class of timber	All species	Softwoods	Hardwoods
Growing-stock trees:			
Sawtimber trees:			
Saw-log portion	478.7	1.7	477.0
Upper-stem portion	227.0	0.7	226.3
Total sawtimber	705.7	2.4	703.3
Poletimber trees	349.0	3.4	345.6
Total growing stock	1,054.7	5.8	1,048.9
Cull trees:			
Rough and rotten cull trees	225.8	2.9	222.9
Short-log cull trees	82.1	1.0	81.1
Total cull trees	307.9	3.9	304.0
Salvable dead trees	0.5	--	0.5
All timber	1,363.1	9.7	1,353.4

Table 42.--Net volume of sawtimber on commercial forest land by species and log grade class, Iowa, 1974

(In million board feet)[1/]

Species	All grades	Log grade 1	2	3	Tie & timber
Softwoods:					
White and red pine	--	--	--	--	--
Eastern redcedar	11.5	--	1.2	10.3	--
Other softwoods	--	--	--	--	--
Total	11.5	--	1.2	10.3	--
Hardwoods:					
Select white oaks	812.4	83.7	196.0	398.1	134.6
Select red oaks	511.2	90.0	191.4	189.2	40.6
Other white oaks	4.7	0.3	1.6	2.7	0.1
Other red oaks	144.2	8.3	34.5	71.4	30.0
Hickory	164.5	9.2	36.9	80.8	37.6
Hard maple	137.0	26.5	33.4	66.1	11.0
Soft maple	361.7	58.2	104.0	177.9	21.6
Ash	99.1	4.0	49.8	41.3	4.0
Cottonwood	436.4	91.3	90.1	245.6	9.4
Aspen	37.6	1.7	5.0	30.3	0.6
Basswood	199.4	51.2	81.4	55.4	11.4
Elm	243.2	35.7	99.0	85.2	23.3
Black walnut	88.3	6.7	29.4	50.1	2.1
Black cherry	23.6	0.4	5.8	11.8	5.6
Hackberry	43.2	3.4	16.8	22.7	0.3
Willow	82.0	2.8	13.8	54.0	11.4
Birch	43.4	5.5	6.6	23.0	8.3
Other hardwoods	43.1	4.9	8.1	20.4	9.7
Total	3,475.0	483.8	1,003.6	1,626.0	361.6
All species	3,486.5	483.8	1,004.8	1,636.3	361.6

[1/] International 1/4-inch rule.

Table 43.--Net volume of growing stock, sawtimber, and rough and rotten trees on commercial forest land by county, Iowa, 1974

County	Growing stock	Rough and rotten[1/]	Sawtimber
	Thousand cubic feet		Thousand board feet[2/]
NORTHEASTERN			
Allamakee	85,128	28,281	283,398
Benton	11,170	4,268	37,602
Black Hawk	6,589	3,263	21,055
Bremer	10,695	3,778	37,506
Buchanan	7,383	2,990	23,745
Butler	5,683	2,642	19,557
Cedar	11,046	4,237	36,787
Chickasaw	6,083	2,117	20,654
Clayton	67,421	23,129	230,933
Clinton	17,187	7,467	56,678
Delaware	13,548	4,616	45,508
Dubuque	27,861	9,932	91,541
Fayette	21,968	7,245	74,766
Floyd	4,799	1,906	16,091
Grundy	379	188	1,169
Howard	5,094	1,676	17,285
Jackson	42,770	15,737	141,002
Johnson	15,075	5,582	51,854
Jones	20,337	7,745	66,261
Linn	21,343	8,379	69,850
Mitchell	3,821	1,288	13,692
Scott	7,292	3,136	24,284
Tama	14,875	5,579	50,692
Winneshiek	32,460	10,715	108,284
Total	460,007	165,896	1,540,194
SOUTHEASTERN			
Appanoose	16,092	4,219	50,925
Boone	13,170	2,940	44,573
Clarke	12,793	3,651	37,171
Dallas	13,277	2,926	44,109
Davis	16,707	4,390	52,222
Decatur	16,664	4,814	50,691
Des Moines	18,156	4,301	59,100
Guthrie	17,990	4,013	59,823
Hamilton	4,344	1,050	14,578
Hardin	6,412	1,464	20,846
Henry	13,606	3,519	41,337
Iowa	14,799	3,146	50,811
Jasper	8,819	1,936	30,483
Jefferson	12,166	2,917	39,385
Keokuk	12,227	2,628	40,642
Lee	32,950	8,127	101,413
Louisa	19,984	4,052	70,708
Lucas	19,873	4,883	62,011
Madison	16,529	4,314	52,500
Mahaska	12,637	2,648	43,064
Marion	10,945	2,992	34,993
Marshall	6,739	1,326	23,790
Monroe	22,009	5,579	68,379
Muscatine	14,633	3,164	49,747
Polk	7,525	1,849	26,300
Poweshiek	5,346	1,197	18,060
Story	4,151	874	14,058
Van Buren	22,760	6,036	71,624
Wapello	16,327	3,789	53,133
Warren	15,597	3,828	51,645
Washington	13,760	3,040	45,317
Wayne	9,830	2,436	31,234
Webster	12,920	2,845	42,888
Total	461,737	110,893	1,497,560

(Table 43 continued on next page)

(Table 43 continued) WESTERN

County	Growing stock	Rough and rotten[1]	Sawtimber
	Thousand cubic feet		Thousand board feet[2]
Adair	3,304	844	10,242
Adams	4,975	1,072	17,765
Audubon	541	165	1,601
Buena Vista	1,103	258	3,220
Calhoun	640	77	3,020
Carroll	634	81	2,770
Cass	1,636	393	6,039
Cerro Gordo	602	60	2,368
Cherokee	2,342	593	7,789
Clay	2,521	527	9,176
Crawford	2,445	601	7,381
Dickinson	111	66	211
Emmet	1,441	339	5,443
Franklin	2,320	403	9,224
Fremont	7,231	1,838	23,025
Greene	4,619	887	17,756
Hancock	211	86	542
Harrison	15,936	3,982	50,579
Humboldt	1,607	307	5,742
Ida	531	42	2,470
Kossuth	2,480	372	10,403
Lyon	1,118	224	4,017
Mills	7,331	1,773	24,308
Monona	12,006	3,170	37,022
Montgomery	3,007	620	10,970
O'Brien	911	168	3,776
Osceola	89	23	327
Page	4,438	1,005	14,591
Palo Alto	1,159	215	4,236
Plymouth	3,150	716	10,935
Pocahontas	436	105	1,035
Potawattamie	7,716	1,849	25,554
Ringgold	8,180	2,023	26,588
Sac	1,025	219	4,117
Shelby	1,231	254	4,806
Sioux	723	102	3,149
Taylor	5,718	1,381	19,164
Union	7,304	1,782	23,263
Winnebago	67	23	120
Woodbury	7,690	1,857	25,277
Worth	593	175	1,858
Wright	1,804	384	6,813
Total	132,926	31,061	448,692
State total	1,054,670	307,850	3,486,446

[1] Includes short-log trees.

[2] International 1/4-inch rule.

Table 44.--Black walnut volume on nonforest land by diameter class and class of timber, Iowa, 1974

Diameter class (Inches at breast height)	Timber class			
	Growing stock	Sawtimber	Short-log	Rough and rotten
	Thousand cubic feet	Thousand board feet[1/]		Thousand cubic feet
5.0- 6.9	219	--	--	159
7.0- 8.9	132	--	--	--
9.0-10.9	--	--	--	921
11.0-12.9	486	2,847	633	215
13.0-14.9	923	5,304	747	155
15.0-16.9	860	4,781	--	446
17.0-18.9	--	--	--	222
19.0-20.9	--	--	--	296
21.0-22.9	--	--	--	--
23.0-28.9	585	2,569	--	--
29.0-38.9	--	--	--	--
39.0+	--	--	--	--
All classes	3,205	15,501	1,380	2,414

[1/] International 1/4-inch rule.

Table 45.--Net annual growth of growing stock on commercial forest land by species and Forest Survey Unit, Iowa, 1973

(In thousand cubic feet)

Species	All units	North-eastern	South-eastern	Western
Softwoods:				
Eastern redcedar	237	34	113	90
Other softwoods	8	8	--	--
Total	245	42	113	90
Hardwoods:				
Select white oaks	6,634	1,857	3,904	873
Select red oaks	3,349	1,499	1,654	196
Other white oaks	53	7	46	--
Other red oaks	1,427	35	1,379	13
Hickory	3,477	741	2,419	317
Hard maple	1,407	1,270	137	--
Soft maple	6,232	2,212	3,785	235
Ash	2,171	888	918	365
Cottonwood	4,518	1,227	1,525	1,766
Aspen	955	911	44	--
Basswood	2,307	1,657	572	78
Elm	1,370	2,315	-809	-136
Black walnut	1,254	596	498	160
Black cherry	615	356	230	29
Hackberry	1,045	174	638	233
Willow	2,256	572	917	767
Birch	1,233	1,055	178	--
Other hardwoods	756	99	590	67
Total	41,059	17,471	18,625	4,963
All species	41,304	17,513	18,738	5,053

Table 46.--Net annual growth of sawtimber on commercial forest land by species and Forest Survey Unit, Iowa, 1973

(In thousand board feet)[1/]

Species	All units	North-eastern	South-eastern	Western
Softwoods:				
Eastern redcedar	-224	-391	154	13
Other softwoods	--	--	--	--
Total	-224	-391	154	13
Hardwoods:				
Select white oaks	18,212	6,217	10,239	1,756
Select red oaks	9,195	4,438	4,404	353
Other white oaks	117	37	80	--
Other red oaks	1,421	-222	1,643	--
Hickory	2,449	712	1,496	241
Hard maple	3,387	3,054	333	--
Soft maple	16,681	5,112	10,763	806
Ash	2,364	1,253	798	313
Cottonwood	18,246	4,805	6,638	6,803
Aspen	1,152	989	163	--
Basswood	5,376	4,416	648	312
Elm	-8,285	-385	-5,359	-2,541
Black walnut	1,603	910	498	195
Black cherry	684	513	171	--
Hackberry	1,050	171	753	126
Willow	3,064	763	1,741	560
Birch	2,102	1,618	484	--
Other hardwoods	1,181	262	797	122
Total	79,999	34,663	36,290	9,046
All species	79,775	34,272	36,444	9,059

[1/] International 1/4-inch rule.

Table 47.--Net annual growth of growing stock and sawtimber on commercial forest land by ownership class and softwoods and hardwoods, Iowa, 1973

Ownership class	Growing stock			Sawtimber		
	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods
	Thousand cubic feet			Thousand board feet[1/]		
Public	6,672	--	6,672	12,716	--	12,716
Forest Industry	470	--	470	848	--	848
Farmer	24,365	180	24,185	46,151	-224	46,375
Miscellaneous Private	9,797	65	9,732	20,060	--	20,060
All owners	41,304	245	41,059	79,775	-224	79,999

[1/] International 1/4-inch rule.

Table 48.--Timber removals from growing stock by species, Iowa, 1973

(In thousand cubic feet)

Species	Total	Removals for products 1/	Other removals
Softwoods:			
Eastern redcedar	80	6	74
Other softwoods	28	25	3
Total	108	31	77
Hardwoods:			
Select white oaks	12,313	1,643	10,670
Select red oaks	7,293	1,875	5,418
Other white oaks	89	11	78
Other red oaks	2,710	642	2,068
Hickory	4,083	591	3,492
Hard maple	1,070	418	652
Soft maple	4,229	1,258	2,971
Ash	2,599	1,477	1,122
Cottonwood	3,857	2,076	1,781
Aspen	663	139	524
Basswood	1,707	648	1,059
Elm	5,711	2,959	2,752
Black walnut	637	559	78
Black cherry	456	21	435
Hackberry	596	115	481
Willow	956	131	825
Birch	535	152	383
Other hardwoods	688	142	546
Total	50,192	14,857	35,335
All species	50,300	14,888	35,412

1/ Includes logging residues.

Table 49.--Timber removals from sawtimber by species, Iowa, 1973

(In thousand board feet)[1/]

Species	Total	Removals for products[2/]	Other removals
Softwoods:			
Eastern redcedar	128	15	113
Other softwoods	132	123	9
Total	260	138	122
Hardwoods:			
Select white oaks	38,564	6,487	32,077
Select red oaks	26,820	7,598	19,222
Other white oaks	228	38	190
Other red oaks	8,012	2,143	5,869
Hickory	8,064	2,512	5,552
Hard maple	3,969	1,963	2,006
Soft maple	15,042	6,714	8,328
Ash	7,046	4,456	2,590
Cottonwood	19,554	11,969	7,585
Aspen	1,502	631	871
Basswood	6,605	3,476	3,129
Elm	17,015	11,376	5,639
Black walnut	2,490	2,490	--
Black cherry	789	113	676
Hackberry	1,702	635	1,067
Willow	2,338	568	1,770
Birch	1,736	750	986
Other hardwoods	1,518	469	1,049
Total	162,994	64,388	98,606
All species	163,254	64,526	98,728

1/ International 1/4-inch rule.

2/ Includes logging residues.

Table 50.--Net annual growth and removals of growing stock on commercial forest land by ownership class and softwoods and hardwoods, Iowa, 1973

(In thousand cubic feet)

Ownership class	Net annual growth			Annual removals		
	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods
Public	6,672	--	6,672	57	--	57
Forest industry	470	--	470	368	--	368
Farmer and miscellaneous private	34,162	245	33,917	49,875	108	49,767
All owners	41,304	245	41,059	50,300	108	50,192

Table 51.--Net annual growth and removals of sawtimber on commercial forest land by ownership class and softwoods and hardwoods, Iowa, 1973

(In thousand board feet)[1/]

Ownership class	Net annual growth			Annual removals		
	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods
Public	12,716	--	12,716	248	--	248
Forest industry	848	--	848	1,642	--	1,642
Farmer and miscellaneous private	66,211	-224	66,435	161,364	260	161,104
All owners	79,775	-224	79,999	163,254	260	162,994

[1/] International 1/4-inch rule.

Table 52.--Net annual growth and removals of growing stock on commercial forest land by species, Iowa, 1973

(In thousand cubic feet)

Species	Net annual growth	Annual timber removals
Softwoods:		
Eastern redcedar	237	80
Other softwoods	8	28
Total	245	108
Hardwoods:		
Select white oaks	6,634	12,313
Select red oaks	3,349	7,293
Other white oaks	53	89
Other red oaks	1,427	2,710
Hickory	3,477	4,083
Hard maple	1,407	1,070
Soft maple	6,232	4,229
Ash	2,171	2,599
Cottonwood	4,518	3,857
Aspen	955	663
Basswood	2,307	1,707
Elm	1,370	5,711
Black walnut	1,254	637
Black cherry	615	456
Hackberry	1,045	596
Willow	2,256	956
Birch	1,233	535
Other hardwoods	756	688
Total	41,059	50,192
All species	41,304	50,300

Table 53.--Net annual growth and removals of sawtimber on commercial forest land by species, Iowa, 1973

(In thousand board feet)[1/]

Species	Net annual growth	Annual timber removals
Softwoods:		
Eastern redcedar	-224	128
Other softwoods	--	132
Total	-224	260
Hardwoods:		
Select white oaks	18,212	38,564
Select red oaks	9,195	26,820
Other white oaks	117	228
Other red oaks	1,421	8,012
Hickory	2,449	8,064
Hard maple	3,387	3,969
Soft maple	16,681	15,042
Ash	2,364	7,046
Cottonwood	18,246	19,554
Aspen	1,152	1,502
Basswood	5,376	6,605
Elm	-8,285	17,015
Black walnut	1,603	2,490
Black cherry	684	789
Hackberry	1,050	1,702
Willow	3,064	2,338
Birch	2,102	1,736
Other hardwoods	1,181	1,518
Total	79,999	162,994
All species	79,775	163,254

[1/] International 1/4-inch rule.

Table 54.--Timber removals from growing stock on commercial forest land by items and softwoods and hardwoods, Iowa, 1973

(In thousand cubic feet)

Item	All species	Softwoods	Hardwoods
Roundwood products:			
Saw logs	7,162	17	7,145
Veneer logs and bolts	865	--	865
Pulpwood	1,609	--	1,609
Cooperage logs and bolts	93	--	93
Piling	--	--	--
Poles	--	--	--
Mine timbers	8	--	8
Posts	126	--	126
Other	222	--	222
Fuelwood	3,106	12	3,094
All products	13,191	29	13,162
Logging residues	1,697	2	1,695
Other removals	35,412	77	35,335
Total removals	50,300	108	50,192

Table 55.--Timber removals from sawtimber on commercial forest land by items and softwoods and hardwoods, Iowa, 1973

(In thousand board feet)[1/]

Item	All species	Softwoods	Hardwoods
Roundwood products:			
Saw logs	41,176	105	41,071
Veneer logs and bolts	3,921	--	3,921
Pulpwood	7,017	--	7,017
Cooperage logs and bolts	562	--	562
Piling	--	--	--
Poles	--	--	--
Mine timbers	10	--	10
Posts	373	--	373
Other	1,210	--	1,210
Fuelwood	7,387	30	7,357
All products	61,656	135	61,521
Logging residues	2,870	3	2,867
Other removals	98,728	122	98,606
Total removals	163,254	260	162,994

[1/] International 1/4-inch rule.

Table 56.--Annual mortality of growing stock and sawtimber on commercial forest land by ownership class and softwoods and hardwoods, Iowa, 1973.

Ownership class	Growing stock			Sawtimber		
	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods
	-Thousand cubic feet-			-Thousand board feet[1/]-		
Public	270	--	270	1,222	--	1,222
Forest industry	80	--	80	299	--	299
Farmer	4,603	50	4,553	17,558	99	17,459
Miscellaneous private	1,954	--	1,954	6,596	--	6,596
All owners	6,907	50	6,857	25,675	99	25,576

[1/] International 1/4-inch rule.

Table 57.--Annual mortality of growing stock and sawtimber on commercial forest land by cause and softwoods and hardwoods, Iowa, 1973

Cause	Growing stock			Sawtimber		
	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods
	- - - -Thousand cubic feet- - - -			- - - -Thousand board feet[1/] - - - -		
Insects	--	--	--	--	--	--
Disease	6,027	--	6,027	22,480	--	22,480
Fire	--	--	--	--	--	--
Animals	--	--	--	--	--	--
Weather	396	--	396	1,816	--	1,816
Suppression	147	--	147	--	--	--
Unknown and other	337	50	287	1,379	99	1,280
Logging	--	--	--	--	--	--
Timber stand improvement	--	--	--	--	--	--
Land clearing	--	--	--	--	--	--
Conversion	--	--	--	--	--	--
All causes	6,907	50	6,857	25,675	99	25,576

[1/] International 1/4-inch rule.

Table 58.--Annual mortality of growing stock on commercial forest land by species and Forest Survey Unit, Iowa, 1973

(In thousand cubic feet)

Species	All units	North-eastern	South-eastern	Western
Softwoods:				
Eastern redcedar	50	50	--	--
Other softwoods	--	--	--	--
Total	50	50	--	--
Hardwoods:				
Select white oaks	225	119	106	--
Select red oaks	801	505	296	--
Other white oaks	--	--	--	--
Other red oaks	729	586	143	--
Hickory	133	133	--	--
Hard maple	--	--	--	--
Soft maple	--	--	--	--
Ash	121	121	--	--
Cottonwood	--	--	--	--
Aspen	45	45	--	--
Basswood	79	79	--	--
Elm	4,261	1,605	1,912	744
Black walnut	37	37	--	--
Black cherry	--	--	--	--
Hackberry	--	--	--	--
Willow	241	241	--	--
Birch	73	73	--	--
Other	112	112	--	--
Total	6,857	3,656	2,457	744
All species	6,907	3,706	2,457	744

Table 59.--Annual mortality of sawtimber on commercial forest land by species and Forest Survey Unit, Iowa, 1973.

(In thousand board feet)[1/]

Species	All units	North-eastern	South-eastern	Western
Softwoods:				
Eastern redcedar	99	99	--	--
Other softwoods	--	--	--	--
Total	99	99	--	--
Hardwoods:				
Select white oaks	290	--	290	--
Select red oaks	3,242	2,410	832	--
Other white oaks	--	--	--	--
Other red oaks	3,179	2,152	1,027	--
Hickory	575	575	--	--
Hard maple	--	--	--	--
Soft maple	--	--	--	--
Ash	548	548	--	--
Cottonwood	--	--	--	--
Aspen	--	--	--	--
Basswood	391	391	--	--
Elm	16,017	5,966	6,497	3,554
Black walnut	--	--	--	--
Black cherry	--	--	--	--
Hackberry	--	--	--	--
Willow	986	986	--	--
Birch	348	348	--	--
Other hardwoods	--	--	--	--
Total	25,576	13,376	8,646	3,554
All species	25,675	13,475	8,646	3,554

[1/] International 1/4-inch rule.

Table 60.--Timber products output from roundwood by species and Forest Survey Unit, Iowa, 1972

(In thousand cubic feet)

Secies	All units	North-eastern	South-eastern	Western
Softwoods:				
White and red pine	37	16	--	21
Eastern redcedar	19	--	--	19
Total	56	16	--	40
Hardwoods:				
Select white oaks	2,121	1,296	787	38
Select red oaks	2,398	1,802	587	9
Other white oaks	13	5	8	--
Other red oaks	728	458	269	1
Hickory	721	435	285	1
Hard maple	348	343	--	5
Soft maple	1,573	363	969	241
Ash	3,720	395	121	3,204
Cottonwood	1,884	355	820	709
Aspen	198	100	93	5
Basswood	674	625	40	9
Elm	6,532	2,318	683	3,531
Black walnut	1,155	703	328	124
Black cherry	23	21	2	
Hackberry	132	52	73	7
Willow	252	220	27	5
Birch	192	59	133	--
Other hardwoods	197	107	66	24
Total	22,861	9,657	5,291	7,913
All species	22,917	9,673	5,291	7,953

Table 61.--Output of timber products by source of material and softwoods and hardwoods, Iowa, 1972

Products and species group	Standard unit	Total		Output from roundwood				Output from plant byproducts	
				Growing stock		Nongrowing stock			
		Number of units	Thousand cu. ft.	Number of units	Thousand cu. ft.	Number of units	Thousand cu. ft.	Number of units	Thousand cu. ft.
Saw logs and bolts:	Thousand bd. ft.[1/]								
Softwood		105	17	105	17	--	--	--	--
Hardwood		53,389	8,987	43,021	7,145	10,368	1,842	--	--
Total		53,494	9,004	43,126	7,162	10,368	1,842	--	--
Veneer logs and bolts:	Thousand bd. ft.[1/]								
Softwood		--	--	--	--	--	--	--	--
Hardwood		5,187	1,157	3,877	865	1,310	292	--	--
Total		5,187	1,157	3,877	865	1,310	292	--	--
Cooperage logs:	Thousand bd. ft.[1/]								
Softwood		--	--	--	--	--	--	--	--
Hardwood		626	102	570	93	56	9	--	--
Total		626	102	570	93	56	9	--	--
Pulpwood:	Standard cords[2/]								
Softwood		11,482	907	--	--	--	--	11,482[3/]	907[3/]
Hardwood		43,136	3,408	20,367	1,609	10,532	832	12,237	967
Total		54,618	4,315	20,367	1,609	10,532	832	23,719	1,874
Poles:	Thousand pieces								
Softwood		--	--	--	--	--	--	--	--
Hardwood		--	--	--	--	--	--	--	--
Total		--	--	--	--	--	--	--	--
Mine timbers:	Thousand cu. ft.								
Softwood		--	--	--	--	--	--	--	--
Hardwood		10	10	8	8	2	2	--	--
Total		10	10	8	8	2	2	--	--
Posts:	Thousand pieces								
Softwood		1	[4/]	1	[4/]	--	--	--	--
Hardwood		325	185	223	126	102	59	--	--
Total		326	185	224	126	102	59	--	--
Charcoal wood:	Standard cords								
Softwood		--	--	--	--	--	--	--	--
Hardwood		--	--	--	--	--	--	--	--
Total		--	--	--	--	--	--	--	--
Other:[5/]	Thousand cu. ft.								
Softwood		3	3	--	--	--	--	3	3
Hardwood		1,377	1,377	222	222	--	--	1,155	1,155
Total		1,380	1,380	222	222	--	--	1,158	1,158
Fuelwood:	Standard cords								
Softwood		600	39	185	12	415	27	--	--
Hardwood		156,299	10,160	47,597	3,094	102,502	6,663	6,200	403
Total		156,899	10,199	47,782	3,106	102,917	6,690	6,200	403
All products:	Thousand cu. ft.								
Softwood		966	966	29	29	27	27	11,485	910
Hardwood		25,386	25,386	13,162	13,162	9,699	9,699	19,592	2,525
Total		26,352	26,352	13,191	13,191	9,726	9,726	31,077	3,435

1/ International 1/4-inch rule.

2/ Cords are on a roughwood, 128 cubic foot basis.

3/ All softwood plant byproducts are from secondary wood-using plants (for example, millwork and furniture plants).

4/ Less than 500 cubic feet.

5/ Includes farm timbers, mulch, livestock bedding, poultry litter, etc.

Table 62.--Output of roundwood products by source, and softwoods and hardwoods, Iowa, 1972

(In thousand cubic feet)

Products and species group	All sources	Growing-stock trees 1/			Rough and rotten trees 1/	Salvable dead trees 1/	Other 2/ sources
		Total	Sawtimber	Poletimber			
Industrial products:							
Sawlogs and bolts:							
Softwood	17	17	17	--	--	--	--
Hardwood	8,987	7,145	7,037	108	1,651	81	110
Total	9,004	7,162	7,054	108	1,651	81	110
Veneer logs and bolts:							
Softwood	--	--	--	--	--	--	--
Hardwood	1,157	865	865	--	216	--	76
Total	1,157	865	865	--	216	--	76
Pulpwood:							
Softwood	--	--	--	--	--	--	--
Hardwood	2,441	1,609	1,512	97	397	15	420
Total	2,441	1,609	1,512	97	397	15	420
All industrial products:							
Softwood	17	17	17	--	--	--	--
Hardwood	12,585	9,619	9,414	205	2,264	96	606
Total	12,602	9,636	9,431	205	2,264	96	606
Misc. industrial products:							
Cooperage:							
Softwood	--	--	--	--	--	--	--
Hardwood	102	93	93	--	9	--	--
Total	102	93	93	--	9	--	--
Piling:							
Softwood	--	--	--	--	--	--	--
Hardwood	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--
Poles:							
Softwood	--	--	--	--	--	--	--
Hardwood	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--
Mine timbers:							
Softwood	--	--	--	--	--	--	--
Hardwood	10	8	1	7	1	--	1
Total	10	8	1	7	1	--	1
Posts							
Softwood	--	--	--	--	--	--	--
Hardwood	185	126	89	37	26	2	31
Total	185	126	89	37	26	2	31
Other:							
Softwood	--	--	--	--	--	--	--
Hardwood	222	222	202	20	--	--	--
Total	222	222	202	20	--	--	--
All misc. industrial products:							
Softwood	--	--	--	--	--	--	--
Hardwood	519	449	385	64	36	2	32
Total	519	449	385	64	36	2	32
All industrial products:							
Softwood	17	17	17	--	--	--	--
Hardwood	12,585	9,619	9,414	205	2,264	96	606
Total	12,602	9,636	9,431	205	2,264	96	606
Fuelwood:							
Softwood	39	12	6	6	5	6	16
Hardwood	9,757	3,094	1,472	1,622	1,367	1,559	3,737
Total	9,796	3,106	1,478	1,628	1,372	1,565	3,753
All products:							
Softwood	56	29	23	6	5	6	16
Hardwood	22,861	13,162	11,271	1,891	3,667	1,657	4,375
Total	22,917	13,191	11,294	1,897	3,672	1,663	4,391

1/ On commercial forest land.

2/ Includes trees less than 5.0 inches in diameter, tree tops and limbs from commercial forest areas or material from noncommercial forest land or nonforest lands such as fence rows on suburban areas.

Table 63.--Roundwood production by species, Forest Survey Unit and product, Iowa, 1972

Species	Saw logs	Veneer logs[1/]	Pulpwood	Other products
	Thousand board feet		Standard cords[2/]	Thousand cubic feet
NORTHEASTERN				
Softwoods	97	--	--	--
White oak	4,558	10	2,000	329
Red oak	8,750	707	3,600	253
Hickory	464	--	3,600	71
Hard maple	1,538	216	400	--
Soft maple	1,495	108	222	82
Ash	1,104	111	200	164
Cottonwood	2,130	35	222	--
Aspen	158	--	778	13
Basswood	2,017	252	89	240
Elm	5,528	233	222	1,369
Black walnut	1,354	1,650	--	48
Black cherry	100	3	45	--
Hackberry	291	--	89	--
Willow	347	--	--	164
Birch	216	--	222	6
Other hardwoods	91	33	--	85
All species	30,238	3,358	11,689	2,824
SOUTHEASTERN				
Softwoods	--	--	--	--
White oak	1,786	8	5,094	72
Red oak	2,296	190	5,094	1
Hickory	315	569	849	33
Hard maple	--	--	--	--
Soft maple	4,529	6	2,335	65
Ash	330	--	--	65
Cottonwood	4,050	50	2,335	--
Aspen	--	--	1,167	--
Basswood	136	--	234	--
Elm	1,426	204	234	391
Black walnut	840	663	--	--
Black cherry	13	--	--	--
Hackberry	236	--	467	--
Willow	61	--	234	--
Birch	256	--	1,167	--
Other hardwoods	2	8	--	64
All species	16,276	1,698	19,210	691

(Table 63 continued on next page)

(Table 63 continued) WESTERN

Species	Products			
	Saw logs	Veneer logs	Pulpwood	Other products
	Thousand board feet[1]		Standard cords[2]	Thousand cubic feet
Softwoods	8	--	--	39
White oak	164	--	--	8
Red oak	33	22	--	--
Hickory	4	--	--	--
Hard maple	30	--	--	--
Soft maple	450	7	--	167
Ash	215	--	--	3,168
Cottonwood	4,594	--	--	--
Aspen	30	--	--	--
Basswood	52	--	--	--
Elm	854	2	--	3,394
Black walnut	475	100	--	--
Black cherry	--	--	--	--
Hackberry	41	--	--	--
Willow	30	--	--	--
Birch	--	--	--	--
Other hardwoods	--	--	--	24
All species	6,980	131	--	6,800
	ALL UNITS			
Softwoods	105	--	--	39
White oak	6,508	18	7,094	409
Red oak	11,079	919	8,694	254
Hickory	783	569	4,449	104
Hard maple	1,568	216	400	--
Soft maple	6,474	121	2,557	314
Ash	1,649	111	200	3,397
Cottonwood	10,774	85	2,557	--
Aspen	188	--	1,945	13
Basswood	2,205	252	323	240
Elm	7,808	439	456	5,154
Black walnut	2,669	2,413	--	48
Black cherry	113	3	45	--
Hackberry	568	--	556	--
Willow	438	--	234	164
Birch	472	--	1,389	6
Other hardwoods	93	41	--	173
All species	53,494	5,187	30,899	10,315

[1] International 1/4-inch rule.
[2] Roughwood basis, 128 cubic feet per standard cord.

Table 64.--Roundwood production in Iowa, 1953 and 1972

(In thousand cubic feet)

Product	All species		Softwoods		Hardwoods	
	1953	1972	1953	1972	1953	1972
Saw logs	9,600	9,004	240	17	9,360	8,987
Veneer logs	700	1,157	--	--	700	1,157
Cooperage logs	500	102	--	--	500	102
Pulpwood	200	2,441	--	--	200	2,441
Posts	1,200	185	--	--	1,200	185
Fuelwood	24,000	9,796	--	39	24,000	9,757
Other products[1/]	400	232	--	--	400	232
All products	36,600	22,917	240	56	36,360	22,861

[1/] Includes mine and farm timbers.

Table 65.--Forest products harvested by ownership class, product, and Forest Survey Unit, Iowa, 1972

Ownership class	Saw logs	Veneer logs	Cooperage logs	Pulpwood	Posts	Mine timbers	Fuelwood	Misc.
	Thousand board feet[1/]			Cords[2/]	Thousand pieces	Thousand cubic feet	Cords[2/]	Thousand cubic feet
NORTHEASTERN								
Federal:								
Softwoods	--	--	--	--	--	--	--	--
Hardwoods	--	--	--	--	--	--	270	--
State:								
Softwoods	--	--	--	--	--	--	--	--
Hardwoods	84	12	--	9	--	--	--	--
Private:								
Industrial:								
Softwoods	--	--	--	--	--	--	--	--
Hardwoods	616	66	--	--	--	--	--	--
Farm and other:								
Softwoods	97	--	--	--	--	--	--	--
Hardwoods	29,441	3,280	355	11,680	160	2	37,800	199
All owners:								
Softwoods	97	--	--	--	--	--	--	--
Hardwoods	30,141	3,358	355	11,689	160	2	38,070	199
SOUTHEASTERN								
Federal:								
Softwoods	--	--	--	--	--	--	--	--
Hardwoods	--	--	--	--	--	--	--	--
State:								
Softwoods	--	--	--	--	1	--	--	--
Hardwoods	132	34	--	95	--	--	20	--
Private:								
Industrial:								
Softwoods	--	--	--	--	--	--	--	--
Hardwoods	427	693	28	1,039	--	--	--	--
Farm and other:								
Softwoods	--	--	--	--	--	--	--	--
Hardwoods	15,717	971	203	18,076	118	8	8,489	23
All owners:								
Softwoods	--	--	--	--	1	--	--	--
Hardwoods	16,276	1,698	231	19,210	118	8	8,509	23
WESTERN								
Federal:								
Softwoods	--	--	--	--	--	--	--	--
Hardwoods	--	--	--	--	--	--	--	--
State:								
Softwoods	--	--	--	--	--	--	--	--
Hardwoods	--	--	--	--	--	--	--	--
Private:								
Industrial:								
Softwoods	--	--	--	--	--	--	--	--
Hardwoods	116	28	--	--	--	--	--	--
Farm and other:								
Softwoods	8	--	--	--	--	--	600	--
Hardwoods	6,856	103	40	--	47	--	103,520	--
All owners:								
Softwoods	8	--	--	--	--	--	600	--
Hardwoods	6,972	131	40	--	47	--	103,520	--
ALL UNITS								
Federal:								
Softwoods	--	--	--	--	--	--	--	--
Hardwoods	--	--	--	--	--	--	270	--
State:								
Softwoods	--	--	--	--	1	--	--	--
Hardwoods	216	46	--	104	--	--	20	--
Private:								
Industrial:								
Softwoods	--	--	--	--	--	--	--	--
Hardwoods	1,159	787	28	1,039	--	--	--	--
Farm and other:								
Softwoods	105	--	--	--	--	--	600	--
Hardwoods	52,014	4,354	598	29,756	325	10	149,809	222
All owners:								
Softwoods	105	--	--	--	1	--	600	--
Hardwoods	53,389	5,187	626	30,899	325	10	150,099	222

[1/] International 1/4-inch rule.
[2/] Standard cords, roughwood basis.

Table 66.--Saw log production by species and state of destination, Iowa, 1972

(In thousand board feet)[1/]

Species	Iowa	Missouri	Minnesota	Kansas	Other states	Total
NORTHEASTERN						
Softwoods:						
White pine	95	0	0	0	0	95
Red pine	2	0	0	0	0	2
Redcedar	0	0	0	0	0	0
Total	97	0	0	0	0	97
Hardwoods:						
White oak	4,246	0	311	0	1	4,558
Red oak	8,297	0	312	0	141	8,750
Hickory	464	0	0	0	0	464
Hard maple	1,520	0	14	0	4	1,538
Soft maple	1,345	150	0	0	0	1,495
Ash	1,090	0	14	0	0	1,104
Cottonwood	2,118	0	0	0	12	2,130
Aspen	144	0	14	0	0	158
Basswood	1,947	0	70	0	0	2,017
Elm	5,528	0	0	0	0	5,528
Black walnut	966	331	14	42	1	1,354
Black cherry	100	0	0	0	0	100
Hackberry	291	0	0	0	0	291
Willow	347	0	0	0	0	347
Birch	202	0	14	0	0	216
Other species	91	0	0	0	0	91
Total	28,696	481	763	42	159	30,141
All species	28,793	481	763	42	159	30,238
SOUTHEASTERN						
Softwoods:						
White pine	0	0	0	0	0	0
Red pine	0	0	0	0	0	0
Redcedar	0	0	0	0	0	0
Total	0	0	0	0	0	0
Hardwoods:						
White oak	1,762	24	0	0	0	1,786
Red oak	2,284	12	0	0	0	2,296
Hickory	315	0	0	0	0	315
Hard maple	0	0	0	0	0	0
Soft maple	4,260	269	0	0	0	4,529
Ash	330	0	0	0	0	330
Cottonwood	4,009	24	0	0	17	4,050
Aspen	0	0	0	0	0	0
Basswood	136	0	0	0	0	136
Elm	1,426	0	0	0	0	1,426
Black walnut	156	199	0	485	0	840
Black cherry	13	0	0	0	0	13
Hackberry	235	1	0	0	0	236
Willow	61	0	0	0	0	61
Birch	256	0	0	0	0	256
Other species	2	0	0	0	0	2
Total	15,245	529	0	485	17	16,276
All species	15,245	529	0	485	17	16,276

(Table 66 continued on next page)

(Table 66 continued)

Species	Iowa	Missouri	Minnesota	Kansas	Other states	Total
WESTERN						
Softwoods:						
White pine	8	0	0	0	0	8
Red pine	0	0	0	0	0	0
Redcedar	0	0	0	0	0	0
Total	8	0	0	0	0	8
Hardwoods:						
White oak	163	1	0	0	0	164
Red oak	33	0	0	0	0	33
Hickory	4	0	0	0	0	4
Hard maple	30	0	0	0	0	30
Soft maple	245	161	0	0	44	450
Ash	206	7	0	0	2	215
Cottonwood	4,578	0	0	0	16	4,594
Aspen	30	0	0	0	0	30
Basswood	44	5	0	0	3	52
Elm	832	0	0	0	22	854
Black walnut	285	173	0	17	0	475
Black cherry	0	0	0	0	0	0
Hackberry	30	11	0	0	0	41
Willow	30	0	0	0	0	30
Birch	0	0	0	0	0	0
Other species	0	0	0	0	0	0
Total	6,510	358	0	17	87	6,972
All species	6,518	358	0	17	87	6,980
ALL UNITS						
Softwoods:						
White pine	103	0	0	0	0	103
Red pine	2	0	0	0	0	2
Redcedar	0	0	0	0	0	0
Total	105	0	0	0	0	105
Hardwoods:						
White oak	6,171	25	311	0	1	6,508
Red oak	10,614	12	312	0	141	11,079
Hickory	783	0	0	0	0	783
Hard maple	1,550	0	14	0	4	1,568
Soft maple	5,850	580	0	0	44	6,474
Ash	1,626	7	14	0	2	1,649
Cottonwood	10,705	24	0	0	45	10,774
Aspen	174	0	14	0	0	188
Basswood	2,127	5	70	0	3	2,205
Elm	7,786	0	0	0	22	7,808
Black walnut	1,407	703	14	544	1	2,669
Black cherry	113	0	0	0	0	113
Hackberry	556	12	0	0	0	568
Willow	438	0	0	0	0	438
Birch	458	0	14	0	0	472
Other species	93	0	0	0	0	93
Total	50,451	1,368	763	544	263	53,389
All species	50,556	1,368	763	544	263	53,494

1/ International 1/4-inch rule.

Table 67.--Saw log production and receipts by species, Iowa, 1969 and 1972

(In thousand board feet)[1/]

Species	Production			Receipts		
	1969	1972	Change	1969	1972	Change
Softwoods	223	105	(-)118	223	105	(-)118
White oak	4,785	6,508	1,723	4,905	6,758	1,853
Red oak	7,329	11,079	3,750	7,771	11,317	3,546
Hickory	365	783	418	441	862	421
Hard maple	1,490	1,568	78	1,670	1,588	(-)82
Soft maple	9,434	6,474	(-)2,960	8,140	6,391	(-)1749
Ash	1,213	1,649	436	1,270	1,697	427
Cottonwood	6,931	10,774	3,843	6,296	11,436	5,140
Aspen	222	188	(-)34	192	178	(-)14
Basswood	1,565	2,205	640	1,672	2,180	508
Elm	7,976	7,808	(-)168	8,054	7,840	(-)214
Black walnut	4,356	2,669	(-)1,687	2,756	7,509	4,753
Black cherry	117	113	(-)4	170	117	(-)53
Birch	323	472	149	272	496	224
Other hardwoods	587	1,099	512	572	1,147	575
All species	46,916	53,494	6,578	44,404	59,621	15,217

[1/] International 1/4-inch rule.

Table 68.--Saw log receipts by species and state of origin, Iowa, 1972

(In thousand board feet)[1/]

Species	All states	NORTHEASTERN							
		Iowa	Missouri	Illinois	Wisconsin	Arkansas	Kansas	Nebraska	Minnesota	South Dakota
Softwoods:										
White pine	93	93	0	0	0	0	0	0	0	0
Red pine	2	2	0	0	0	0	0	0	0	0
Total	95	95	0	0	0	0	0	0	0	0
Hardwoods:										
White oak	4,848	4,692	0	60	72	0	0	0	24	0
Red oak	9,572	9,160	0	80	164	0	0	0	168	0
Hickory	550	536	0	5	6	0	0	0	3	0
Hard maple	1,548	1,510	0	10	16	0	0	0	12	0
Soft maple	2,254	2,247	0	0	3	0	0	0	4	0
Ash	1,235	1,214	0	7	9	0	0	0	5	0
Cottonwood	2,272	2,265	0	0	2	0	0	0	5	0
Aspen	138	134	0	0	1	0	0	0	3	0
Basswood	1,995	1,963	0	10	14	0	0	0	8	0
Elm	6,166	6,129	0	12	17	0	0	0	8	0
Black walnut	2,055	1,025	0	235	671	0	0	0	124	0
Black cherry	104	100	0	2	2	0	0	0	0	0
Hackberry	272	272	0	0	0	0	0	0	0	0
Willow	339	339	0	0	0	0	0	0	0	0
Birch	218	218	0	0	0	0	0	0	0	0
Other species	114	91	0	4	19	0	0	0	0	0
Total	33,680	31,895	0	425	996	0	0	0	364	0
All species	33,775	31,990	0	425	996	0	0	0	364	0
		SOUTHEASTERN								
Hardwoods:										
White oak	1,753	1,354	180	219	0	0	0	0	0	0
Red oak	1,732	1,441	173	118	0	0	0	0	0	0
Hickory	308	243	40	25	0	0	0	0	0	0
Hard maple	40	40	0	0	0	0	0	0	0	0
Soft maple	4,115	3,581	374	160	0	0	0	0	0	0
Ash	394	352	29	13	0	0	0	0	0	0
Cottonwood	4,662	4,326	229	107	0	0	0	0	0	0
Aspen	40	40	0	0	0	0	0	0	0	0
Basswood	168	147	10	11	0	0	0	0	0	0
Elm	1,364	1,347	15	2	0	0	0	0	0	0
Black walnut	97	80	15	2	0	0	0	0	0	0
Black cherry	13	13	0	0	0	0	0	0	0	0
Hackberry	301	284	15	2	0	0	0	0	0	0
Willow	99	99	0	0	0	0	0	0	0	0
Birch	278	240	35	3	0	0	0	0	0	0
Other species	22	2	10	10	0	0	0	0	0	0
Total	15,386	13,589	1,125	672	0	0	0	0	0	0
All species	15,386	13,589	1,125	672	0	0	0	0	0	0

(Table 68 continued on next page)

(Table 68 continued)

Species	All states	Iowa	Missouri	Illinois	Wisconsin	Arkansas	Kansas	Nebraska	Minnesota	South Dakota
					WESTERN					
Softwoods:										
White pine	10	10	0	0	0	0	0	0	0	0
Red pine	0	0	0	0	0	0	0	0	0	0
Total	10	10	0	0	0	0	0	0	0	0
Hardwoods:										
White oak	157	125	0	0	0	0	0	32	0	0
Red oak	13	13	0	0	0	0	0	0	0	0
Hickory	4	4	0	0	0	0	0	0	0	0
Hard maple	0	0	0	0	0	0	0	0	0	0
Soft maple	22	22	0	0	0	0	0	0	0	0
Ash	68	60	0	0	0	0	0	8	0	0
Cottonwood	4,502	4,114	0	0	0	0	0	194	0	194
Aspen	0	0	0	0	0	0	0	0	0	0
Basswood	17	17	0	0	0	0	0	0	0	0
Elm	310	310	0	0	0	0	0	0	0	0
Black walnut	5,357	302	3,183	0	0	756	705	411	0	0
Black cherry	0	0	0	0	0	0	0	0	0	0
Hackberry	0	0	0	0	0	0	0	0	0	0
Willow	0	0	0	0	0	0	0	0	0	0
Birch	0	0	0	0	0	0	0	0	0	0
Other species	0	0	0	0	0	0	0	0	0	0
Total	10,450	4,967	3,183	0	0	756	705	645	0	194
All species	10,460	4,977	3,183	0	0	756	705	645	0	194
					ALL UNITS					
Softwoods:										
White pine	103	103	0	0	0	0	0	0	0	0
Red pine	2	2	0	0	0	0	0	0	0	0
Total	105	105	0	0	0	0	0	0	0	0
Hardwoods:										
White oak	6,758	6,171	180	279	72	0	0	32	24	0
Red oak	11,317	10,614	173	198	164	0	0	0	168	0
Hickory	862	783	40	30	6	0	0	0	3	0
Hard maple	1,588	1,550	0	10	16	0	0	0	12	
Soft maple	6,391	5,850	374	160	3	0	0	0	4	0
Ash	1,697	1,626	29	20	9	0	0	8	5	0
Cottonwood	11,436	10,705	229	107	2	0	0	194	5	194
Aspen	178	174	0	0	1	0	0	0	3	0
Basswood	2,180	2,127	10	21	14	0	0	0	8	0
Elm	7,840	7,786	15	14	17	0	0	0	8	0
Black walnut	7,509	1,407	3,198	237	671	756	705	411	124	0
Black cherry	117	113	0	2	2	0	0	0	0	0
Hackberry	573	556	15	2	0	0	0	0	0	0
Willow	438	438	0	0	0	0	0	0	0	0
Birch	496	458	35	3	0	0	0	0	0	0
Other species	136	93	10	14	19	0	0	0	0	
Total	59,516	50,451	4,308	1,097	996	756	705	645	364	194
All species	59,621	50,556	4,308	1,097	996	756	705	645	364	194

1/ International 1/4-inch rule.

Table 69.--Veneer log and bolt production by species and state or country of destination, Iowa, 1972

(In thousand board feet)[1/]

Species	Total	Destination						
		Iowa	Wisconsin	Indiana	Illinois	Ohio	Missouri	Other States
Softwoods:								
White pine	0	0	0	0	0	0	0	0
Red pine	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0
Hardwoods:								
White oak	18	6	5	0	2	5	0	0
Red oak	919	168	743	0	8	0	0	0
Hickory	569	569	0	0	0	0	0	0
Hard maple	216	0	161	33	22	0	0	0
Soft maple	121	0	95	0	0	0	0	26
Ash	111	79	32	0	0	0	0	0
Cottonwood	85	0	0	0	0	0	0	85
Aspen	0	0	0	0	0	0	0	0
Basswood	252	0	252	0	0	0	0	0
Elm	439	204	235	0	0	0	0	0
Black walnut	2,413	149	0	492	230	220	147	[2/] 1,175
Black cherry	3	0	3	0	0	0	0	0
Hackberry	0	0	0	0	0	0	0	0
Willow	0	0	0	0	0	0	0	0
Birch	0	0	0	0	0	0	0	0
Other species	41	0	0	17	0	0	24	0
Total	5,187	1,175	1,526	542	262	225	171	1,286
All species	5,187	1,175	1,526	542	262	225	171	1,286

[1/] International 1/4-inch rule.

[2/] Exported to other countries.

Table 70.--Veneer log production for selected years, Iowa, 1960-1972

(In thousand board feet)[1/]

Species	1960	1963	1966	1968	1970	1972
Red oak	919	551	867	1,385	930	919
Hickory	--	--	7	32	361	569
Hard maple	584	337	245	454	292	216
Soft maple	822	223	320	182	97	121
Cottonwood	1,040	71	849	411	1,121	85
Elm	1,070	34	([2/])	641	483	439
Black walnut	[3/]3,138	[3/]4,339	[3/]3,138	[3/]3,429	[3/]785	[4/]2,413
Other hardwoods	1,376	990	1,484	1,148	525	425
All species	8,949	6,545	6,910	7,682	4,594	5,187

[1/] International 1/4-inch rule.

[2/] Included with "other hardwoods".

[3/] Does not include exports overseas.

[4/] Includes exports overseas.

Table 71.--Pulpwood production by species groups, Iowa, 1956-1972

(In standard cords, roughwood basis)

Year	Total all sources	From roundwood				From residue	
		Total	Softwoods	Soft hardwoods	Hard hardwoods	Softwoods	Hardwoods
1956	19,000	19,000	--	15,000	4,000	--	--
1957	14,505	14,505	--	10,487	4,018	--	--
1958	15,079	15,079	--	9,443	5,636	--	--
1959	21,129	21,129	--	11,803	9,326	--	--
1960	23,496	23,496	100	15,376	8,020	--	--
1961	22,461	22,461	--	12,411	10,050	--	--
1962	(1/)	28,490	--	14,403	14,087	--	(1/)
1963	(1/)	19,572	--	10,372	9,200	--	(1/)
1964	(1/)	32,998	80	15,320	17,598	--	(1/)
1965	31,079	24,678	--	12,596	12,082	--	6,401
1966	36,324	27,149	--	13,959	13,190	--	9,175
1967	35,343	27,040	--	11,675	15,365	--	8,303
1968	37,862	24,877	--	12,035	12,842	2,833	10,152
1969	31,580	16,851	40	8,031	8,780	1,501	13,228
1970	57,681	36,101	80	16,321	19,700	10,227	11,353
1971	52,537	37,859	40	14,843	22,976	7,908	6,770
1972	54,618	30,899	--	10,062	20,837	11,482	12,237

1/ Not available.

Table 72.--Production and disposition of softwood and hardwood plant byproducts and plant residue by type of byproduct, disposal, Forest Survey Unit, and county, Iowa 1972

(In thousand cubic feet)

NORTHEASTERN

County and type of use	Plant byproducts and plant residue						Bark	
	Total		Coarse1/		Fine2/			
	Softwood	Hardwood	Softwood	Hardwood	Softwood	Hardwood	Softwood	Hardwood
Allamakee								
Fiber products	0	153.3	0	153.3	0	0	0	0
Miscellaneous3/	0	39.2	0	0	0	39.2	0	1.9
Not used4/	0	50.2	0	0	0	50.2	0	97.1
Total	0	242.7	0	153.3	0	89.4	0	99.0
Benton								
Domestic fuel	0	0.7	0	0.7	0	0	0	0.5
Miscellaneous3/	0	57.3	0	0	0	57.3	0	0
Not used4/	0	98.6	0	98.2	0	0.4	0	63.4
Total	0	156.6	0	98.9	0	57.7	0	63.9
Black hawk								
Domestic fuel	0	19.2	0	19.2	0	0	0	12.4
Miscellaneous3/	0	11.2	0	0	0	11.2	0	0
Total	0	30.4	0	19.2	0	11.2	0	12.4
Butler								
Domestic fuel	0	0	0	0	0	0	0	12.4
Miscellaneous3/	0	22.4	0	0	0	22.4	0	0
Not used4/	0	53.6	0	48.0	0	5.6	0	18.6
Total	0	76.0	0	48.0	0	28.0	0	31.0
Cedar								
Domestic fuel	0	57.6	0	57.6	0	0	0	37.2
Miscellaneous3/	0	33.6	0	0	0	33.6	0	0
Not used4/	0	136.8	0	86.4	0	50.4	0	55.8
Total	0	228.0	0	144.0	0	84.0	0	93.0
Clayton								
Fiber products	0	332.1	0	332.1	0	0	0	58.9
Domestic fuel	0	47.0	0	47.0	0	0	0	30.4
Miscellaneous3/	0	157.9	0	20.2	0	137.7	0	44.3
Not used4/	0	95.2	0	0	0	95.2	0	124.3
Total	0	632.2	0	399.3	0	232.9	0	257.9
Delaware								
Fiber products	0	95.0	0	95.0	0	0	0	0
Not used4/	0	55.4	0	0	0	55.4	0	61.4
Total	0	150.4	0	95.0	0	55.4	0	61.4
Dubuque								
Fiber products	0	57.6	0	57.6	0	0	0	364.6
Miscellaneous3/	0	16.8	0	0	0	16.8	0	0
Not used4/	0	158.2	0	77.9	0	80.3	0	95.6
Total	0	232.6	0	135.5	0	97.1	0	460.2
Jackson								
Fiber products	0	89.2	0	89.2	0	0	0	57.6
Domestic fuel	0	24.0	0	24.0	0	0	0	15.5
Miscellaneous3/	0	57.8	0	0	0	57.8	0	0
Not used4/	0	53.7	0	28.7	0	25.0	0	18.5
Total	0	224.7	0	141.9	0	82.8	0	91.6
Johnson								
Domestic fuel	0	22.0	0	22.0	0	0	0	14.2
Miscellaneous3/	0	16.0	0	0	0	16.0	0	0
Not used4/	0	5.5	0	5.5	0	0	0	3.5
Total	0	43.5	0	27.5	0	16.0	0	17.7
Jones								
Fiber products	0	22.5	0	22.5	0	0	0	14.1
Miscellaneous3/	0	17.8	0	0	0	17.8	0	0
Not used4/	0	151.1	0	90.0	0	61.1	0	62.3
Total	0	191.4	0	112.5	0	78.9	0	76.4
Linn								
Domestic fuel	0	16.8	0	16.8	0	0	0	10.9
Miscellaneous3/	0	12.8	0	1.9	0	10.9	0	1.2
Not used4/	0	54.0	0	34.1	0	19.9	0	22.1
Total	0	83.6	0	52.8	0	30.8	0	34.2
Mitchell								
Miscellaneous3/	2.1	2.1	0	0	2.1	2.1	0	0
Not used4/	3.6	3.6	3.6	3.6	0	0	2.3	2.3
Total	5.7	5.7	3.6	3.6	2.1	2.1	2.3	2.3

(Table 72 continued on next page)

(Table 72 continued)

SOUTHEASTERN (continued)

County and type of use	Plant byproducts and plant residue							
	Total		Coarse1/		Fine2/		Bark	
	Softwood	Hardwood	Softwood	Hardwood	Softwood	Hardwood	Softwood	Hardwood
Monroe								
Domestic fuel	0	7.6	0	0.6	0	7.0	0	7.8
Not used4/	0	11.4	0	11.4	0	0	0	0
Total	0	19.0	0	12.0	0	7.0	0	7.8
Van Buren								
Domestic fuel	0	5.6	0	5.6	0	0	0	3.5
Miscellaneous3/	0	22.1	0	0	0	22.1	0	0
Not used4/	0	117.6	0	86.1	0	31.5	0	55.7
Total	0	145.3	0	91.7	0	53.6	0	59.2
Wapello								
Domestic fuel	0	21.0	0	21.0	0	0	0	13.6
Miscellaneous3/	0	49.0	0	0	0	49.0	0	0
Not used4/	0	63.0	0	63.0	0	0	0	40.7
Total	0	133.0	0	84.0	0	49.0	0	54.3
Warren								
Not used4/	0	7.6	0	4.8	0	2.8	0	3.1
Total	0	7.6	0	4.8	0	2.8	0	3.1
Washington								
Domestic fuel	0	19.8	0	19.8	0	0	0	12.8
Miscellaneous3/	0	15.4	0	0	0	15.4	0	0
Not used4/	0	40.8	0	28.2	0	12.6	0	18.2
Total	0	76.0	0	48.0	0	28.0	0	31.0
All counties, Southeast								
Fib products	0	194.4	0	194.4	0	0	0	0
Domestic fuel	0	102.4	0	95.4	0	7.0	0	69.0
Miscellaneous3/	0	256.8	0	0	0	256.8	0	53.5
Not used4/	0	616.2	0	448.9	0	167.3	0	782.2
Total	0	1,169.8	0	738.7	0	431.1	0	904.7
WESTERN								
Clay								
Industrial fuel	0	68.4	0	0	0	68.4	0	55.4
Miscellaneous3/	0	62.1	0	50.0	0	12.1	0	0
Total	0	130.5	0	50.0	0	80.5	0	55.4
Franklin								
Miscellaneous3/	0.3	2.5	0	0	0.3	2.5	0	0
Not used4/	0.5	4.3	0.5	4.3	0	0	0.3	2.8
Total	.8	6.8	.5	4.3	.3	2.5	0.3	2.8
Greene								
Domestic fuel	0	2.8	0	0	0	2.8	0	0
Not used4/	0	4.8	0	4.8	0	0	0	3.1
Total	0	7.6	0	4.8	0	2.8	0	3.1
Hancock								
Domestic fuel	0	3.1	0	3.1	0	0	0	0
Miscellaneous3/	0	1.8	0	0	0	1.8	0	0
Not used4/	0	0	0	0	0	0	0	2.0
Total	0	4.9	0	3.1	0	1.8	0	2.0
Humboldt								
Domestic fuel	0	1.9	0	1.9	0	0	0	0
Miscellaneous3/	0	1.1	0	0	0	1.1	0	0
Not used4/	0	0	0	0	0	0	0	1.2
Total	0	3.0	0	1.9	0	1.1	0	1.2
Lyon								
Industrial fuel	0	0.5	0	0.5	0	0	0	0
Not used4/	0	0.3	0	0	0	0.3	0	0.3
Total	0	.8	0	0.5	0	0.3	0	0.3
Page								
Domestic fuel	0	0.6	0	0.6	0	0	0	0
Miscellaneous3/	0	0.4	0	0	0	0.4	0	0
Not used4/	0	9.0	0	5.7	0	3.3	0	4.1
Total	0	10.0	0	6.3	0	3.7	0	4.1
Pottawattamie								
Miscellaneous3/	0	199.2	0	199.2	0	0	0	0
Not used4/	0	431.7	0	199.2	0	232.5	0	257.4
Total	0	630.9	0	398.4	0	232.5	0	257.4

(Table 72 continued on next page)

(Table 72 continued)

NORTHEASTERN (continued)

County and type of use	Plant byproducts and plant residue							
	Total		Coarse1/		Fine2/		Bark	
	Softwood	Hardwood	Softwood	Hardwood	Softwood	Hardwood	Softwood	Hardwood
Scott								
Fiber products	0	45.6	0	45.6	0	0	0	0
Miscellaneous3/	0	30.4	0	2.4	0	28.0	0	0
Not used4/	0	0	0	0	0	0	0	31.0
Total	0	76.0	0	48.0	0	28.0	0	31.0
Tama								
Domestic fuel	0.1	35.0	0.1	35.0	0	0	0.1	22.6
Miscellaneous3/	0.4	97.6	0	0	0.4	97.6	0	0
Not used4/	0.6	132.3	0.6	132.3	0	0	0.4	85.6
Total	1.1	264.9	0.7	167.3	0.4	97.6	0.5	108.2
All counties, Northeast								
Fiber products	0	795.3	0	795.3	0	0	0	495.2
Domestic fuel	0.1	222.3	0.1	222.3	0	0	0.1	156.1
Miscellaneous3/	2.5	572.9	0	24.5	2.5	548.4	0	47.4
Not used4/	4.2	1,048.2	4.2	604.7	0	443.5	2.7	741.5
Total	6.8	2,638.7	4.3	1,646.8	2.5	991.9	2.8	1,440.2
SOUTHEASTERN								
Appanoose								
Fiber products	0	67.2	0	67.2	0	0	0	0
Miscellaneous3/	0	31.4	0	0	0	31.4	0	0
Not used4/	0	8.9	0	0.7	0	8.2	0	43.8
Total	0	107.5	0	67.9	0	39.6	0	43.8
Dallas								
Miscellaneous3/	0	17.9	0	0	0	17.9	0	0
Not used4/	0	30.7	0	30.7	0	0	0	19.8
Total	0	48.6	0	30.7	0	17.9	0	19.8
Davis								
Domestic fuel	0	0.4	0	0.4	0	0	0	0.3
Miscellaneous3/	0	4.2	0	0	0	4.2	0	0
Not used4/	0	6.8	0	6.8	0	0	0	4.4
Total	0	11.4	0	7.2	0	4.2	0	4.7
Hamilton								
Miscellaneous3/	0	1.8	0	0	0	1.8	0	0
Not used4/	0	7.8	0	6.0	0	1.8	0	3.9
Total	0	9.6	0	6.0	0	3.6	0	3.9
Hardin								
Domestic fuel	0	48.0	0	48.0	0	0	0	31.0
Miscellaneous3/	0	42.0	0	0	0	42.0	0	0
Not used4/	0	62.0	0	48.0	0	14.0	0	31.0
Total	0	152.0	0	96.0	0	56.0	0	62.0
Iowa								
Miscellaneous3/	0	16.4	0	0	0	16.4	0	0
Not used4/	0	28.1	0	28.1	0	0	0	18.1
Total	0	44.5	0	28.1	0	16.4	0	18.1
Lee								
Fiber products	0	127.2	0	127.2	0	0	0	0
Miscellaneous3/	0	40.1	0	0	0	40.1	0	51.0
Not used4/	0	115.3	0	51.3	0	64.0	0	491.9
Total	0	282.6	0	178.5	0	104.1	0	542.9
Louisa								
Miscellaneous3/	0	1.0	0	0	0	1.0	0	0
Not used4/	0	77.7	0	49.7	0	28.0	0	32.1
Total	0	78.7	0	49.7	0	29.0	0	32.1
Marion								
Miscellaneous3/	0	6.3	0	0	0	6.3	0	0
Not used4/	0	16.5	0	14.4	0	2.1	0	9.3
Total	0	22.8	0	14.4	0	8.4	0	9.3
Marshall								
Miscellaneous3/	0	9.2	0	0	0	9.2	0	2.5
Not used4/	0	22.0	0	19.7	0	2.3	0	10.2
Total	0	31.2	0	19.7	0	11.5	0	12.7

(Table 72 continued on next page)

(Table 72 continued)

WESTERN (continued)

County and type of use	Plant byproducts and plant residue							
	Total		Coarse1/		Fine2/		Bark	
	Softwood	Hardwood	Softwood	Hardwood	Softwood	Hardwood	Softwood	Hardwood
Sioux								
Domestic fuel	0	0.5	0	0.5	0	0	0	0
Miscellaneous3/	0	0.8	0	0.5	0	0.3	0	0
Not used4/	0	13.9	0	8.6	0	5.3	0	6.2
Total	0	15.2	0	9.6	0	5.6	0	6.2
Union								
Miscellaneous3/	0	3.6	0	0	0	3.6	0	0
Not used4/	0	6.2	0	6.2	0	0	0	4.0
Total	0	9.8	0	6.2	0	3.6	0	4.0
Woodbury								
Miscellaneous3/	0	51.6	0	15.5	0	36.1	0	20.0
Not used4/	0	46.5	0	46.5	0	0	0	20.0
Total	0	98.1	0	62.0	0	36.1	0	40.0
Wright								
Domestic fuel	0	0.5	0	0.5	0	0	0	0
Miscellaneous3/	0	2.5	0	0	0	2.5	0	0.9
Not used4/	0	3.8	0	3.8	0	0	0	1.8
Total	0	6.8	0	4.3	0	2.5	0	2.7
All counties, Western								
Industrial fuel	0	68.9	0	0.5	0	68.4	0	55.4
Domestic fuel	0	9.4	0	6.6	0	2.8	0	0
Miscellaneous3/	0.3	325.6	0	265.2	0.3	60.4	0	20.9
Not used4/	0.5	520.5	0.5	279.1	0	241.4	0.3	302.9
Total	0.8	924.4	0.5	551.4	0.3	373.0	0.3	379.2
ALL UNITS								
All counties								
Fiber products	0	989.7	0	989.7	0	0	0	495.2
Industrial fuel	0	68.9	0	0.5	0	68.4	0	55.4
Domestic fuel	0.1	334.1	0.1	324.3	0	9.8	0.1	225.1
Miscellaneous3/	2.8	1,155.3	0	289.7	2.8	865.6	0	121.8
Not used4/	4.7	2,184.9	4.7	1,332.7	0	852.2	3.0	1,826.6
Total	7.6	4,732.9	4.8	2,936.9	2.8	1,796.0	3.1	2,724.1

1/ Suitable for chipping such as slabs, edgings, veneer cores, etc.

2/ Not suitable for chipping such as sawdust, veneer clippings, etc.

3/ Livestock bedding, mulch, small dimension, and specialty items.

4/ Plant residue.

Table 73.--Volume of primary plant byproducts and plant residue by source industry, kind of material, and type of use, Iowa, 1972

(In thousand cubic feet)

Source industry and kind of material	Plant byproducts by type of use							
	Fiber[1]	Fuel[2]			Other[3]		Plant residue[4]	
		Industrial	Domestic					
	Hardwood	Hardwood	Softwood	Hardwood	Softwood	Hardwood	Softwood	Hardwood
Lumber:								
Coarse[5]	987.2	0.5	0.1	324.3	--	239.7	4.7	1,305.0
Fine[6]	--	0.1	--	9.8	2.8	847.3	--	809.5
Bark	129.4	--	0.1	225.1	--	79.0	3.0	1,411.6
Total	1,116.6	0.6	0.2	559.2	2.8	1,166.0	7.7	3,526.1
All other:								
Coarse[5]	2.5	--	--	--	--	50.0	--	27.7
Fine[6]	--	68.3	--	--	--	18.3	--	42.7
Bark	365.8	55.4	--	--	--	42.8	--	415.0
Total	368.3	123.7	--	--	--	111.1	--	485.4
All industries:								
Coarse[5]	989.7	0.5	0.1	324.3	--	289.7	4.7	1,332.7
Fine[6]	--	68.4	--	9.8	2.8	865.6	--	852.2
Bark	495.2	55.4	0.1	225.1	--	121.8	3.0	1,826.6
Total	1,484.9	124.3	0.2	559.2	2.8	1,277.1	7.7	4,011.5

[1] For manufacture of pulp, hardboard, or roofing felt.

[2] Includes fuel given away.

[3] Includes uses such as livestock bedding, mulch, small dimension, and specialty items.

[4] Includes residue burned as waste.

[5] Plant byproduct or residue suitable for chipping.

[6] Plant byproduct or residue not suitable for chipping.

Table 74.--Primary wood-using plants operating in 1972 by Forest Survey Unit, Iowa

(In number of plants)

Kind of mill[1]	All units	Northeastern	Southeastern	Western
Sawmills:				
Large[2]	21	13	6	2
Medium[3]	27	12	12	3
Small[4]	12	1	4	7
Subtotal	60	26	22	12
Veneer mills	2	1	--	1
Cooperage mills	1	1	--	--
Pulpmills	2	1	1	--
Subtotal	5	3	1	1
Total all mills	65	29	23	13

[1] Excludes idle mills.

[2] Annual output of more than 1 million board feet.

[3] Annual output of from 0.101 to 1.000 million board feet.

[4] Annual output of less than 0.101 million board feet.

Table 75.--Removals[1], net annual growth, and inventory of growing stock on commercial forest land, Iowa, 1974, and low removals option projections[2] to 2004.

(In million cubic feet)

Year	All species		
	Removals	Growth	Inventory
1974	50.3	41.3	1,054.7
1984	45.7	40.1	984.1
1994	41.8	39.3	948.6
2004	38.4	37.2	931.7

[1] Timber removals includes volume "lost" due to land clearing, flooding, thinning, or changes in land use, in addition to timber cut and used.

[2] Based on the following assumptions: (a) that the overall removals rate will be lower than that for the high removals option; (b) that annual removals rates will differ for each timber product but that timber removals will decrease at an average annual rate of 0.789 percent or 397 thousand cubic feet; (c) that the total area of commercial forest land will decline at an annual rate of 0.475 percent; (d) that radial growth will decline over time in relation to the increase of basal area per acre of trees; (e) that the intensity of forest management practiced will continue at the rate indicated by recent trends; (f) that the volume of "other" removals will drop during the period as more of these trees are utilized.

Table 76.--Removals[1], net annual growth, and inventory of growing stock on commercial forest land, Iowa, 1974, and high removals option projections[2] to 2004

(In million cubic feet)

Year	All species		
	Removals	Growth	Inventory
1974	50.3	41.3	1,054.7
1984	49.3	39.7	961.4
1994	45.7	37.3	874.1
2004	44.3	32.7	773.9

[1] Timber removals includes volume "lost" due to land clearing, flooding, thinning, or changes in land use, in addition to timber cut and used.

[2] Based on the following assumptions: (a) that the overall removals rate will be higher than that for the low removals option; (b) that annual removals rates will differ for each timber product but that timber removals will decrease at an average annual rate of 0.398 percent or 200 thousand cubic feet; (c) that the total area of commercial forest land will decline at an annual rate of 0.475 percent; (d) that radial growth will decline over time in relation to the increase of basal area per acre of trees; (e) that the intensity of forest management practiced will continue at the rate indicated by recent trends; (f) that the volume of "other" removals will drop during the period as more of these trees are utilized.

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IOWA

North Central Forest Experiment Station
Forest Service
U.S. Department of Agriculture
1974

OSCEOLA
DICKINSON
EMMET
KOSSUTH
WINNEBAGO
WORTH
MITCHELL
HOWARD
WINNESHIEK
ALLAMAKEE
O'BRIEN
CLAY
PALO ALTO
HANCOCK
CERRO GORDO
FLOYD
CHICKASAW
FAYETTE
CLAYTON
CHEROKEE
BUENA VISTA
POCAHONTAS
HUMBOLDT
WRIGHT
FRANKLIN
BUTLER
BREMER
BUCHANAN
DELAWARE
DUBUQUE
IDA
SAC
CALHOUN
WEBSTER
HAMILTON
HARDIN
GRUNDY
BLACK HAWK
CRAWFORD
CARROLL
GREENE
BOONE
STORY
MARSHALL
TAMA
BENTON
LINN
JONES
JACKSON
CLINTON
CEDAR
HARRISON
SHELBY
AUDUBON
GUTHRIE
DALLAS
POLK
JASPER
POWESHIEK
IOWA
JOHNSON
SCOTT
MUSCATINE
POTTAWATTAMIE
CASS
ADAIR
MADISON
WARREN
MARION
MAHASKA
KEOKUK
WASHINGTON
LOUISA
MILLS
MONTGOMERY
ADAMS
UNION
CLARKE
LUCAS
MONROE
WAPELLO
JEFFERSON
HENRY
DES MOINES
FREMONT
PAGE
TAYLOR
RINGGOLD
DECATUR
WAYNE
APPANOOSE
DAVIS
VAN BUREN
LEE

PINE
OAK-HICKORY
ELM-ASH-COTTONWOOD
PRODUCTIVE RESERVE

Scale 1:1,000,000
1 inch equals approximately 16 miles

10 0 10 20 30 40 Miles

10 0 10 20 30 40 50 Kilometers

RLH

Spencer, John S., Jr., and Pamela J. Jakes.
1980. Iowa's forest resources, 1974. U.S. Department of Agriculture Forest Service, Resource Bulletin NC-52, 90 p. U.S. Department of Agriculture Forest Service, North Central Forest Experiment Station, St. Paul, MN.

The second inventory of Iowa's forest resources shows big declines in commercial forest area and in growing-stock and sawtimber volumes between 1954 and 1974. Presented are text and statistics on forest area and timber volume, growth, mortality, ownership, stocking, future timber supply, timber use, forest management opportunities, and nontimber resources.

KEY WORDS: timber volume, growth, utilization, forest areas.